Oasys Software Suite

Version 9.3

Update and Release Notes

Oasys

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1 Introduction

The Oasys 9.3 suite of software, dated October 2008, is the culmination of a protracted development period which included several interim “release candidate” versions of the software. The chronology of these programme releases is given in the following table:

Oasys PRIMER	**RC1** Feb 2007	**RC2** Oct 2007	**RC2+** Jan 2008
Oasys D3PLOT	**RC1** Nov 2007		
Oasys T/HIS	**RC1** July 2007	**RC2** Dec 2007	
Oasys REPORTER	(No previous 9.3 release)		
Oasys_93 SHELL	(No formal release history)		

This document lists the enhancements that have been made during development, the bugs that have been fixed and those that are known to remain. Each “case id” referred to in these lists is unique and should be cited if more information or clarification are required.

1.1 Compatibility with LS-DYNA releases

The Oasys 9.3 release has been used and tested with LS-DYNA version 971 release R3, supports all the keywords in the LS971 User’s Manual (except *CASE and *EF), and many of the keywords available in LS971 R3.2.1 that are not in the User’s Manual (e.g. *AIRBAG_PARTICLE). LS971 R3 is now the default keyword output format from Oasys PRIMER.

1.2 Hardware platforms supported

The complete Oasys 9.3 software suite is available on the following platforms:

Windows	2000, XP and Vista XP 64 and Vista 64	32 bit 32 and 64 bit
Linux 2.4 kernel	RedHat 7.3	32 bit only
Linux 2.6 kernel *	Suse 9.0 and 10.0	32 and 64 bit
	Redhat Enterprise 4.0 and 5.0	32 and 64 bit
HP PA-RISC	UX11.0 and 11.11	32 and 64 bit
HP Itanium	UX 11.23	32 and 64 bit
Sun	Solaris 8 and 10	32 and 64 bit
Silicon Graphics	Irix 6.5	32 and 64 bit
IBM	AIX 5.1	32 and 64 bit

* We build Linux 2.6 kernel versions on both SuSe and RedHat, however we have found that the executables seem to be completely interchangeable with no problems or loss of performance.

1.3 Graphics hardware supported

The default graphics protocol used on all platforms in the table above is OpenGL, which gives good quality 3D performance on a wide range of hardware.
“Legacy” X-Windows (2D only) graphics drivers remain in PRIMER and D3PLOT on Unix and Linux platforms since these are used by a small minority of clients who display over a network of mixed machine types.
The 2D X-Windows driver has been withdrawn from T/HIS for technical reasons, however it is now linked with both hardware OpenGL (the default) and the MESA emulator on Unix and Linux. MESA emulates OpenGL in software on X-Windows, therefore clients using a mixed machine environment with only 2D X-Windows support will still be able to display graphics.

1.4 What the "known bugs" listings below contain

The "known bugs" listings contain only those cases which, in our opinion, may have a significant effect on users. Our tracking system also contains other "unsolved bugs" that have been excluded from the listings because the problem is very obscure, or because the problem is trivial, or because the reported fault could not be reproduced.

2 Oasys PRIMER

2.1 Enhancements made and bugs fixed in Oasys PRIMER 9.3

There are many pages of enhancements and bug-fixes, and listed chronologically they would be completely indigestible. Therefore these have been broken down into the following topics. Within each topic enhancements and bug-fixes are listed by case ID (most recent first), with those from releases RC2/2+ and RC1 italicised.

The topics are:

Airbags
Assign Mass
Checking
Clipboard
Coat Part
Connections
Contour plotting
Clipboard
Copying
Cross references
Database (including Model build)
Dummies, Seatbelts, Mechanisms, FMH
Editing (general and keyword panels)
Find attached
Graphics
Groups
Include files
Measure
Menus (user interface)
Merge
Meshing
Miscellaneous
Model modified
Orient
Parameters
Part Replace
Part table
Picking
Reading & writing files
Remove
Renumbering
Rigidify
Units

The major enhancements are described in the PPT presentation available to download from our website at **www.oasys-software.com/dyna**. They are also listed by case in the detailed pages under the topics above, but a summary is given here:

A summary of the main enhancements made in release 9.3

- Support for all keywords in the LS-DYNA 971 Users Manual except *CASE and *EF.
- Addition of a completely new scripting interface (JavaScript)
- Addition of a new “Adhesive” connection capability
- Completely revised and much more powerful generic Keyword editor
- A new NASTRAN translator
- Logging of errors and warnings during keyword input
- More control over keyword output, including conversion of parameters to numbers
- More data fields available and other enhancements for the Part Table
- More functionality added to the cross-reference viewer
- Support for mouse scroll-wheel (graphics zoom and menu scroll)
- Foam Reference Geometry coordinates may now be viewed.
- Airbag Shell Reference shell topology may now be viewed.
- Remove and Clean-up unused now show why items are “locked” against deletion
- Contact surface display is now much faster (stippled transparency replaces hatching)
- The sum of selected ELEMENT_MASS elements can be computed
- Deletion by Include file has more options and capability
- Database build has more capability, including GUI for multiple impact cases from .csv file
- More functions have a command-line syntax added for batch processing
- More powerful include file renumbering options (tabular menu)
- Improved “Coat” option for coating structure with shells or segments
- Contouring now uses discrete contour bands of actual values where possible.
- Improvements to FMH positioning and model building.

- Improved Dummy Angles File (.daf) format, including global position and rotation
- Mechanism improvements:
  - Assemblies in Include Transforms now have their *Define Transforms updated
  - More options and better control over hinge joint rotation angles
  - Children of mechanisms (typically dummies) have more linkage DoF options
- Part can be spotwelded to itself
- Spotweld merge function
- New functions to fix tied contact errors caused by nearby rigid bodies, or by nodes or parts being absent from the tied contact definition
- Various other improvements for bolts and spotwelds improvements
- MIG weld – line of spotweld beams on the free edge of a part
- Contact penetration display more selective with improved fixing capabilities.

A summary of the enhancements made in release 9.3RC2/2+

- *Extensive support for LS971 keywords*
- *All edit panels support *PARAMETER and *PARAMETER_EXPRESSION*
- *Character labels for *MATERIAL, *SECTION, *HOURGLASS and *EOS*
- *Model merge with reduced memory consumption and optional node merge*
- *User configuration of PRIMER error/warnings messages*
- *Enhancement of spotweld/bolt connection function*
- *Mechanism and dummy functionality improved*
- *Seatbelt refit capability*
- *Seat-foam compression algorithm improved*
- *Background image with image matching and support for new image types*
- *Keyword storage of part colour and transparency*
- *Easy *SET_SEGMENT creation from coating of elements*
- *Add/removal of *ELEMENT_SHELL_<option>*
- *Include file renumbering function improved*

A summary of the enhancements made in release 9.3RC1

- *Single/multiple copy on translate and rotate*
- *Orient scale/rotate option to centre on CofG of part*
- *Display of cut-sections*
  - control visibility of elements either side of section plane
  - drag section through the model (translate/rotate)
  - cut section through shell element shows true thickness
- *Include file location of entity displayed and modified on edit panels*
- *Generic handling of text box overflow (hover text)*
- *Optional check for mesh continuity of rigid bodies*
- *Function to remove include file from model*
- *Version checking for include files*
- *Overwrite/increment name function for keyout of include files*
- *Enhanced translation for Radioss block format*
- *BOM write of part mass and CofG coordinates*
- *Full support for solid element spotwelds including multiple-element "nuggets"*
- *Connection entity concept implemented*
  - PRIMER xml connection file
  - connection table to manage/edit/fix spotwelds/bolts
  - support for connection between layers of parts defined by Set, CAD-name, etc
- *Bolts (merged rigid patch or Nodal Rigid Body) can be created, read from file, interpreted from existing FE model*
- *Capability to create and position arbitrary mechanisms*
  - assemblies of parts can be linked to form mechanisms
  - position mechanism by dragging or typing in coordinates of reference points

- occupant models can also be positioned “freely” as mechanisms by dragging
- mechanisms can be linked, e.g. seat mechanism can “drive” dummy motion

- *Seat foam compression within PRIMER*
- *Seat foam compression – assisted creation of LS-DYNA deck*
- *ECER21 Instrument panel pendulum impact simulation*
- *Model build from database enhancements*
  - support for Nastran component files
  - integration of PRIMER connection file
  - version control and history comment storage

Airbags

Enhancements made in release 9.3

- **Case 10656**

An option has been added (in display options) to enable the user to interchange *ELEMENT_ SHELL and *AIRBAG_SHELL_REFERENCE_GEOMETRY topologies to help with airbag visualization.

Bugs fixed in release 9.3

- **Case 10910**

In the mesh-independent airbag folder, if the split goes wrong and PRIMER gives a 'Fatal error' message to the dialogue box, a message box is now written which the user has to click on. This is to warn them that the data may now be corrupt and that they should not overwrite the original model.
Additionally, when choosing the parts for a mesh-independent origami, parts that do not contain elements are trapped as they would probably cause a crash.

- **Case 10647**

If the reference coordinates were swapped (in display options panel) and the user forgot to swap them back before reading a model then PRIMER would have the normal and ref geometry swapped over for the model. Now whenever a model is created (and hence when a model is read, copied, merged etc) the reference geometry is swapped back to normal first so prevent this problem.

- **Case 9195**

If the node sets used in the airbag folder contained nodes which were unattached (i.e. not attached to the shells used in the airbag folder) the folds could not be what the user expects. A check has been added when the airbag folder starts which allows the user to remove any unattached nodes from the node sets if required.

- **Case 9048**

When doing mesh-independent folding the set definitions for previous folds could get messed up if sets other than the origami set are used because of 2 problems.

1) If the fold couldn't be done and the airbag folder tried to bail out latent unused nodes could be left in some set definitions. The next time a fold is successfully done the node numbers are reused and incorrect nodes get put into sets.

2) After a fold is successfully done the node sets are rebuilt from shell sets. However the node sets were not emptied before rebuilding and this caused incorrect nodes to be left in some sets.

Both problems have now been fixed.

Bugs fixed in release 9.3 RC2

- **Case 9716**

In the airbag folder, if a scale fold was done after a star fold the scale factors were initially 0.0 which caused problems. They are now initialised to 1.0.

- **Case 8609**

In the airbag folder sometimes the graphic shown for the spiral fold options could get very large and was drawn over the entire airbag folder menu. This has now been fixed.

Assign Mass

Enhancements made in release 9.3

- **Case 10979**

A simple function has been added which allows the user get a report from the dialogue box of the total mass of *ELEMENT_MASS selected from the object menu.

Bugs fixed in release 9.3

- **Case 11919**

PRIMER could very occasionally hang when starting the assign mass panel. This has now been fixed.

- **Case 10666**

Assign mass function has been modified to allow use of *ELEMENT_MASS_PART(_SET) on shell parts. If the definition adds mass it is treated the same as non-structural mass on the section card (MAREA). If it sets the target mass (FINMASS) for a part, PRIMER assign mass operation will not add any lumped mass to the nodes of the part.

- **Case 10625**

COPY and COPY_EXISTING functions have been prohibited in PRIMER's Assign Mass function. These functions do not work well in this context.

Bugs fixed in release 9.3 RC2+

- ***Case 11024***

Plot of 'MASS TO BE ADDED' in Assign mass function was not working. This is now fixed.

Bugs fixed in release 9.3RC1

- ***Case 9158***

*Assign mass function was not detecting mass 'attached' to a part/parts to be massed by *CONSTRAINED_NODE_SET. This has now been corrected to work in same way as *NODAL_RIGID_BODY.*

Checking

Enhancements made in release 9.3

- **Case 11719**

LS-Dyna 971R3 does not initialize if the slope of plastic strain (ETAN, ES/EPS or LCSS) exceeds the value of Elastic Modulus. The error check has been added to PRIMER.

- **Case 11573**

PRIMER includes a new Error Check when DATABASE_BINARY_D3PLOT has beam plot option set to 0 (or when DATABASE_BINARY_D3PLOT is absent):

PRIMER checks whether any spring/damper element labels clash with beam labels. This can be auto-fixed by setting BEAM (on DATABASE_EXTENT_BINARY) to 1.

- **Case 11524**

It has been observed that small rigid parts can be unstable in LS-DYNA, due to the mass of the rigid part overriding the mass-scaled mass of nodes on the boundary between the rigid part and surrounding deformable elements. PRIMER now checks this during a model check. The checking algorithm is approximate and may in some cases be conservative, i.e. there is a chance of false alarms.

An autofix is available which converts the rigid body to Part_Inertia and scales up the mass properties.

The default for the check is <auto> (PRIMER calculates the stability mass). In place of <auto>, the user may set his own minimum mass criterion (check > options > rigid).

Additionally for bolt creation, there is a preference (adjust_bolt_mass_on_create) which will automatically apply the stability criterion to bolts on creation.

- **Case 11268**

A check has been added to flag up as warning any spotwelds (beam or solid) where a node attaches to a shell on a free edge. The check is optional.

- **Case 11254**

A check has been added which warns that node attached by constrained tied contact risks being released if the same master segment has been used by another constrained tied contact. The check is applied both to connection checking and contact checking and the option can be invoked in the penetration check panel. It is on by default.

- **Case 11076**

A new check has been added to warn if contact thickness of shell is reduced because of the dimensions of the shell.

- **Case 10940**

A check has been added to give error if any of nodes N1...N2 on *LOAD_BODY_GENERALIZED belong to PART_INERTIA or NRBC_INERTIA.

- **Case 10826**

Checking function now generates a warning upon finding empty parts (contains no elements or nodes and is not merged with another rigid part). This check is user switchable.

- **Case 10142**

Check of beam release codes against other constraints has been added.

- **Case 9627**

Check option panel has now been divided into sub-panels for easier management of the numerous options.

- **Case 7440**

When the error checker finds an error or warning for a type of entity for which PRIMER has a Keyword Editor, there is now an option from the drop-down menu to load the offending entities into the keyword editor.

- **Case 4166**

Conflicting (too close) spotwelds are now reported as a connection error by model checking and can easily be fixed by deletion function on the check tree or by merging on the connection table.

- **Case 3969**

PRIMER can now check for and generate a warning about deformable parts that have discontinuous meshes. This check is user-selectable and can be controlled from Tools->Check->Options->Part. This check can also be enabled/disabled by default using the oa_pref.xml file.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10578***

PRIMER model check was missing rigorous connectivity check for spotwelds. PRIMER now checks that these are correctly tied and reports connection errors if spotwelds are missing from contact, illegal contact type has been used or presence of rigid body invalidates constrained type contact.

- ***Case 10513***

PRIMER now rigorously checks the element formulation of beam parts for compatibility with the material of the part and issues an error message if they are not.

- ***Case 10309***

A new check has been added to warn users of rigid parts (and nodal rigid bodies) of which the mass falls short of user defined minimum. An autofix is available which converts the item to _INERTIA type, calculating the CofG and Inertia tensor. The mass is set to the target value and the inertia terms are scaled up by the ratio of mass increase.
*For *CONSTRAINED_NODAL_RIGID_BODIES the Inertia tensor is calculated by making a estimate of the "lumped inertia" of the attached shell or beam element at each node, this is reasonably close to (but not exactly the same as) the values that LS-DYNA uses.*

Enhancements made in release 9.3 RC1

- ***Case 9505***

Discretization of MAT24 load-curves in some versions of LS-Dyna uses 1000pts rather than the previous 100pts. Users may now change the default from 100 to 1000 on the check options panel. There is also a new oa_pref option <mat24_discretization_points>.

*Note – in PRIMER 9.3 this option has been removed. Like LS-DYNA 971R3, PRIMER now uses LCINT on *CONTROL_SOLUTION to control the discretization of curves referenced by materials. If the parameter is undefined, the default is 100.*

Bugs fixed in release 9.3

- **Case 12072**

The apply rules check has been updated to work more consistently with model checking.

- **Case 11746**

A harmless error message that might've been triggered by editing edit load curves and other entities from within *DAMPING panels has been fixed.

- **Case 11532**

PRIMER does not issue an error message if field 'IRR' of a *SECTION_BEAM card with element formulation 2 is zero.

- **Case 11421**

PRIMER no longer issues an error message if field 'RA' of a *INTEGRATION_BEAM card is left zero when using a standard section shape.

- **Case 11338**

Element type - material compatibility checks have been updated for all materials.

- **Case 11191**

A spurious error message about non-zero axis terms of inertia terms of PART_INERTIA when IRCS option is set to 1 has been removed. Any local axis system can be used to describe the tensor and it does not have to be the principle system.

- **Case 11122**

LS-Dyna will not initialize if Airbag_reference_geometry node does not exist in the model. PRIMER now reports this as an error.

- **Case 10833**

The autofix which removes nodes from a *NODAL_RIGID_BODY which clashes with a spotweld tied on by constrained contact was not working in RC2. It has been fixed.

- **Case 10746**

Turning off the spotweld warpage check was not inhibiting the check.This has been fixed.

- **Case 9493**

PRIMER now flags the following conditions as errors and issues error messages:

1. *MAT_ADD_EROSION card is added to a PART with a SECTION card containing elements other than solids and shells.

2. *MAT_ADD_EROSION card is added to a material which is incompatible with both solid and shell elements.

- **Case 7074**

PRIMER issues an error message when orthotropic materials with 'AOPT'=1.0 are used with shell elements

Bugs fixed in release 9.3 RC2+

- ***Case 10766***

In two contexts the calculation of the mass of a rigid part is incorrect. This only applies if the rigid part has lumped mass attached or is meshed directly onto deformable elements. The error occurs:

1. *In a model check where a minimum mass for a rigid part has been specified (PRIMER may find fewer errors than it should)*
2. *In the mass properties reported in the dialogue box when the "CofG" button on the part edit panel is pressed.*

The mass for rigid parts in the part table and the summary file is correct.

- ***Case 10729***

The checks that PRIMER does on connections could run extremely slowly if the model contained latent shells (e.g. from a set shell definition). The contact penetration checking could also have shown the same problem. This has now been fixed.

- ***Case 10723***

*The autofix for a *SET definition referencing items that do not exist was removing all entries by error, not just the latent entries. Corrected now.*

- ***Case 10716***

The spotweld separation check in RC2 used the distance between connection points as the measure of spotweld separation. This check has been improved to use, the average of the coordinates of the spotweld nodes. This is a more accurate measure of the centre of the spotweld. Additionally the check is now applied only between spotwelds that share at least one panel.

- ***Case 10689***

If spotweld beams are connected by CONTACT_TIED_SURFACE_TO_SURFACE, or TIED_NODES_TO_SURFACE, this is now reported as an error.

Bugs fixed in release 9.3 RC2

- ***Case 10445***

PRIMER checking has been modified, so that if an error occurs during checking (typically a failure to allocate a flagging bit), it now terminates the function and tidies up the check panel (or refuses to write the check info in batch mode). This means the user will be given no error information rather than misleading information.

- ***Case 10422***

LS-DYNA will not initialize if any MAT24 card has ETAN value greater than or equal to E. The same applies if stress strain data is tabulated using ES and EPS and the ratio ES1-ES0/EPS1-EPS0 is greater than or equal to E. This test is applied regardless of presence of LCSS (the initial slope of which is never tested!). As the plastic modulus is the ratio of stress: plastic strain (not total strain) one may question the validity of such an error check. A carefully worded PRIMER error check has been added.

- ***Case 10306***

*Added checks to detect and warn the user if multiple *MAT_ADD_THERMAL_EXPANSION cards with the identical <PID> values are defined. In the past, clicking on the 'Check All' button under 'Thermal Materials' or 'MAT_ADD_THERMAL_EXPANSION' would actually check only structural materials. Also PRIMER was failing to keyout *MAT_ADD_THERMAL_EXPANSION if the include file contained no ordinary structural or thermal materials. These have all been fixed.*

- ***Case 10265***

When deleting from check tree it was possible to start a second deletion operation without completing the first. This left the window for the first operation unable to be dismissed. A change has been made so that the user is obliged to complete each deletion. The same logic has been applied in other places (e.g. rigidify) where a function requires the user to perform a deletion operation.

- ***Case 10243***

*On the *ELEMENT_SOLID_ORTHO card PRIMER checks that the A and D vectors are not co-linear. The tolerance of this check was set to |A| . |D| > 0.999 which was tripped at about 2.5 degrees, and models with this situation ran quite happily in LS-DYNA. Therefore the tolerance has been tightened to 0.9999, or about 0.85 degrees, resulting in fewer unnecessary error messages.*

- ***Case 10077***

*Errors in items which use node sets of type _GENERAL or _GENERATE (e.g. *RIGIDWALL, *LOAD_THERMAL, *CONSTRAINED_NODAL_RIGID_BODY) were not always detected in PRIMER's model check function. The difficulty arises because decomposition of these sets (particularly _GENERAL) is potentially slow and therefore cannot be done per item check. This has now been fixed, and the model check is now rigorously correct.*

- ***Case 10043***

*Model checking could be very slow for large models that contain several *SET_NODE_GENERAL cards. This should now be significantly faster.*

- ***Case 9998***

Sketch of spotweld beams/solids from error check tree in item (not error) mode could crash the code. This has been fixed.

- ***Case 9905***

*If you had a model with *ELEMENT_MASS_PART PRIMER would give spurious errors when checking a model (that there were multiple element types referring to a part). This is now fixed.*

- ***Case 9660***

The check on orientation nodes of beams has been corrected to ignore cases where the node is not required. Additionally the beam edit panel has been improved to grey the N3 field in these cases.

- ***Case 9485***

PRIMER's check for overlapping nodal-rigid-body constraints did not account for those defined by SET_GENERAL or SET_GENERATE. The model check now has an up front pass to decompose these sets (which is potentially a slow operation and therefore not suitable for the individual check) and will find any such errors.

Bugs fixed in release 9.3 RC1

- ***Case 9651***

PRIMER did not check for the node <sbrnid> on a slipring being massless or unrestrained in translation, which is an error during initialisation in LS-DYNA. The same check was missing for retractor nodes (which LS-DYNA does not appear to pick up). These checks have now both been added.

- ***Case 9095***

*PRIMER could give a confusing warning message when checking spotweld beams if spiders of 'normal' beams were given ELFORM 9 (spotweld) on the *SECTION_BEAM card by mistake. This has now been fixed*

Clipboard

Bugs fixed in release 9.3

- **Case 3656**

If control cards were placed on the clipboard and then they were modified they would be removed from the clipboard without the user knowing (as they are rebuilt when modified).
This has now been fixed.

Bugs fixed in release 9.3 RC2

- ***Case 9983***

In the clipboard, 'save as model', 'save as keyword' etc. would fail if the clipboard contained a latent (non-existent item that is referred to) item. This has been fixed.

Bugs fixed in release 9.3RC1

- ***Case 7855***

Multiple redraws when finding attached through the clipboard has been reduced. This operation is much quicker now.

Coat (was Coat Part & Coat Elements)

Enhancements made in release 9.3

- **Case 6922**

Some new options have been incorporated into the Coat function (previously called Coat Part). In addition to coating solid/shell parts with shells or segment sets, users can now coat elements, or even a specific solid face with shells or segment sets.

An option to select a solid face and to propagate this face by coating adjacent faces that satisfy a break angle criterion is also available.

In addition, segment sets can now be created on solid faces from the Segment Set panel. The Segment Set panel would accomplish this by calling the Coat panel.

Enhancements made in release 9.3RC1

- ***Case 9542***

Coat part function now uses a single object menu, externally filtered to solid and shell parts. This means that screen picking is active for all parts displayed in the object menu and the user no longer has to click <vis> to activate it.

Bugs fixed in release 9.3

- **Case 10813**

A criticism of the 'Coat elements' facility when creating or editing *SET_SEGMENT cards was that if only a subset of a solid or thick shell part was selected it would create segments on the exposed faces, despite the fact that these were topologically internal.

Therefore this has been revised to give three options:

1. 'External faces' (the default). Only faces on the selected elements which would be externally visible were all elements of this type to be unblanked are coated. In other words only element faces that are topologically external.

2. 'Exposed faces'. Faces which would be exposed were only the selected elements to be unblanked are coated. (This was the original behaviour.)

3. 'Visible faces'. Only faces on the selected elements which are currently visible on the plot are coated. This is intended for view factor calculations where only facets visible from a given viewpoint should be selected, and it is unlikely to have an application in normal structural analyses.

The same options have also been made available in the COAT PART panel.

Connections

This section contains cases related to both “Connections” (in the PRIMER sense) cases, and also those referring to welds of he various types available.

Enhancements made in release 9.3

- **Case 12057**

Added in command line writing out of connections files for all connections in the model in PRIMER spotweld, PRIMER XML and UG format. Also the user defined script option can be used now in batch.

- **Case 11779**

As originally programmed the function which creates connections from welds used a geometric test to decide to which shell each spotweld node connected. This took no account of spotweld contacts in the model. Consequently if coincident parts existed, PRIMER could use the wrong part (i.e. not the one in the contact) for the layer. This has been fixed. PRIMER will now prefer the part that is used in the spotweld contact.

- **Case 11776**

Command line syntax has been added to allow connections to be remade in batch mode.

- **Case 11621**

A function has been added to enable bolts to be previewed before they are made. This allows appropriate adjustment of the bolt diameter.

- **Case 11620**

Handling of nodal rigid bodies in From_fe function has been improved. PRIMER now only considers those where all nodes are attached to shells. Additionally there is a filter to only consider those where the nrb forms a straight line to a reasonable tolerance.

- **Case 11570**

It is now possible filter connections by number of layers in the object menus.

- **Case 11569**

Display of number of panels has been added to connection table.

- **Case 11568**

It is now possible to control which columns are shown by default in the connection and part tables.

- **Case 11566**

The connections table allows user to convert beam type butt welds to 'beamless' form where connectivity is achieved simply by
CONTACT_TIED_SHELL_EDGE_TO_SURFACE_BEAM_OFFSET.

- **Case 11523**

A preference (strict_layer_method_for_bolts) has been added which will abort bolt creation if label ranges have not been defined for all relevant layers, when the label method is first free in layer, highest free in layer or highest+1 in layer.

- **Case 11522**

An oa_pref (bolt_entity_numbering_rule) has been added which controls the labelling of parts/matls/shells/nrbcs used for bolts. This option will over-rule the current setting on the options panel and only applies for bolts.

- **Case 11521**

On creating or remaking a bolt PRIMER now has the option (oa_pref: use_parent_layer_for_bolts) to put connection and FE into the layer of the parent panels. If the panels are in different layers, PRIMER will put the overlaid elements and their part (and optional material) into the appropriate

parent layer and the rest into the current layer. The old behaviour of creating in the current layer is still the default.

- **Case 11387**

PRIMER is now able to have a connection entity connecting a part to itself (same part connections). This is done by setting a preference or turning on an option on the options panel.

- **Case 11267**

PRIMER can now create a connection between shells of the same part ID. Option is turned on in the option panel.

- **Case 11094**

Internal nodes in solid spotweld nuggets tie to their layer only if the contact is defined with a node set, not if defined by part. PRIMER check has been modified to account for this.

- **Case 10885**

PRIMER now offers 2 connections options for keyout

1. to suppress write of all connections
2. to suppress connections which PRIMER has automatically created from weld data.

The latter is safe as all connection info can be re-created from the welds, the former option risks losing data and should be used with caution.

- **Case 10846**

Connection table default view now shows ID, type, subtype, part id, diameter, layer 1, layer 2, layer 3, status, error, details

- **Case 10843**

A new feature has been added to connection table which allows 2 or more welds that conflict (i.e. are closer together than the user specified minimum separation distance) to be merged by making a weld at the average position and deleting the conflicting connections. If such a weld cannot be made the original connections will be restored.

- **Case 10842**

'Show conx & panels' function off connection table has been modified to also unblank attached nodal rigid body or rigid body where these cause a connectivity error due to clash with constrained contact.

- **Case 10719**

A new option has been added to the connections table to remake spotwelds or bolts with their connection point position at the average position of the nodes involved. This helps when repositioning a connection slightly and you wish to keep the connection point central to the connection, rather than it being transfered to an outer layer when using 'from shell' to reposition.

- **Case 10688**

A new connection contact function has been added to deal with spotweld and adhesive contacts. The function allows multiple contacts to be defined and modified. It also offers a fixing routine to deal with cases where constrained contact won't tie due to presence of another constraint.

- **Case 10617**

Refresh of status data of connections on table has been improved. The data will now be updated (1) whenever the table is set up (2)whenever the refresh button is pressed (3) whenever spotweld are remade on the table.

- **Case 10564**

The connection object menu displayed by 'select' from the connection table has been corrected to only display connections on the table.

- **Case 10559**

When shells are moved from on part to another, PRIMER will detect if any of these are attached to a spotweld connection. If so PRIMER will check that the new part is included in the connection

layer definition. If it is not the user will be given the option of fixing by either adding the new part to the layer or replacing the old.

- **Case 9898**

Columns have been added to connection table which will be of use to those interested in spotweld failure. These are: minimum thickness of attached panels, average thickness of attached panels, minimum yield stress of attached panels, and average yield stress of attached panels.

- **Case 9868**

PRIMER RC2 used a simple distance check to determine whether a spotweld was correctly tied by contact to its shell. In RC3 this test has been re-written to use the proper tied contact check as used in the penetration checking panel.

- **Case 9611**

When creating/remaking solid spotwelds, PRIMER now detects any shell free edges near the spotweld and uses the free edge to orient the solid spotweld.

- **Case 8103**

'Adhesive' connection type added. These work in a similar way to the other connection types (spotwelds and bolts). Adhesives are created with additional path data, as well as path width and element sizes. Adhesives attributes can be modified through the connection table in the same way as other connection types, and also the path can be tweaked, extended or split. Adhesives can also be read in or written out using PRIMER's XML connection file format.

- **Case 4166**

Conflicting (too close) spotwelds are now reported as a connection error by model checking and can easily be fixed by deletion function on the check tree.

Enhancements made in release 9.3 RC2/RC2+

- **Case 10490**

In the connections table to change the part of a layer by typing in the new part label you had to type P<label> (i.e. prepend the letter P to the label). This has now been changed. If you just type in a label PRIMER assumes that it is now a part label and automatically adds the P.

- **Case 10352**

Find connected 'weld/bolts from panels' in connections/spotwelder only worked for attached panels (i.e. for welds that have been realized and are sufficiently close to the panel). A new option 'weld/bolts from layer parts' has now been added which will find welds/bolts through the parts defined on the layer. This will work for connections that are bad/invalid or have not yet been made.

- **Case 9938**

When you pick a new location for a connection in the connection table a blob is now drawn at the position to give you feedback. Additionally sketch will now sketch the current position (filled blob) and original position (wireframe blob) for connections.

- **Case 9937**

In the connections table 'Show Entire Weld Seam' now unblanks the connection entities as well as the beams/solids etc.

- **Case 9936**

When making 3 layer spotwelds from a PRIMER spotweld file, if one of the parts could not be found PRIMER would give a warning but create a 2 layer weld. This is now treated as an error and a bad connection is created instead. Note that this problem applies to old PRIMER spotweld files, not the new xml connection files.

- **Case 9876**

In the connections table there is now a 'Delete layer' option if you right click on a layer column. Also Layer 3 is now shown by default in the connections panel.

Bugs fixed in release 9.3

- **Case 11799**
PRIMER could crash if the connections table or part table are expended to a size with greater than 50 rows of data. This would usually only occur if the table was expanded off the screen. Corrected now.

- **Case 11796**
The connection table option to change position of connection has been limited to case where one connection only is selected.

- **Case 11711**
PRIMER could remap the connection->read panel incorrectly if dismissing out of the part selection panel for 'PRIMER spotweld' type connections. Corrected now.

- **Case 11700**
PRIMER could give (-1) as the number of parts removed when removing a part with the CONX_ACTION set to 'Remove layer'. This would only occur if a latent part was used on the connection entity. Corrected now.

- **Case 11651**
When creating spotwelds from a node set the layer information was not set up for bad welds (e.g. if too close to an existing weld). This has now been fixed.

- **Case 11513**
PRIMER could crash when carrying out operations (such as remake or sketch) in the connections table, when the connections table is empty. Corrected now.

- **Case 11503**
PRIMER did not work correctly when reading in spotweld/connection data through the batch command SPOTWELD. This bug was introduced after version 9.2.3. Corrected now.

- **Case 11394**
Early versions of connection checking assumed that connectivity was achieved if the contact checker reported all the nodes of the spotweld to be in tied contact. This, however, is only true if all the nodes are tying to a segment on each layer defined. With a very thick contact this may not be the case. The logic has been upgraded.

- **Case 11393**
When part ids of shells, solids or beams are changed by the edit panel or the keyword editor, the data stored for connection entities could become out of sync. To avoid this special handling functions have been added which will modify connection data as necessary with a minimum of user intervention.

- **Case 11276**
PRIMER could have given an invalid error if a spotweld connection with more than 2 layers had randomly ordered layer information. This has been corrected

- **Case 10855**
Reproject spotwelds function after part replace had not been updated to work with PRIMER connection methodology. The button has been renamed 'remake connections' and any connections that fail to remake (e.g. because panel separation now exceeds maximum spotweld length) are put onto the table for inspection.

- **Case 10817**
RC2 was applying spotweld separation check incorrectly. Each spotweld was being checked unconditionally against every other weld. Now each is only checked against other welds that share at least one part. The change has also made the check considerably quicker.

- **Case 10807**

PRIMER RC2 would lose spotweld connectivity on remaking connections when slave side of contact was defined by node set. On completion of remake, spotweld nodes are now restored to the node set and connectivity is maintained.

- **Case 10798**

If you made a solid spotweld that used shells from 2 different parts in one of the layers, PRIMER could move some of the shells from one of the parts into the other when making the spotweld. This has now been fixed.

- **Case 10789**

Spurious error message about spotweld part not being in contact would appear when the spotweld part was latent (i.e. had no section or material defined). This has been corrected.

- **Case 10784**

When creating a line of spotwelds if some (but not all)of the welds could not be made the undo option was not made available. This has been fixed.

- **Case 10774**

Some of the options to choose connections in the connections menu have been renamed as people found them confusing.

1. 'By layer part' is now 'By panels'
2. 'Attached to panels' is now 'By attached panels'.
3. 'By panels' will find connections that have the panel(s) in the connection layer definition. 'Attached to panels' will only fid connections that actually have nodes tied to the panel(s).

- **Case 10772**

The 'connection action' in the Remove panel has now been made available from the Part->Delete panel. The logic in this has also been improved to work better with connections that are not 'realised'.

- **Case 10760**

PRIMER could have problems creating spotwelds near part boundaries when a layer was defined with 2 parts in it. This has now been fixed.
Additionally when reading a model with a solid spotweld with a layer that used multiple parts PRIMER would not create the layer definition correctly when making the connection entity. This has been fixed.

- **Case 10752**

A more rigorous check of contact type used to tie beam and solid spotwelds has been written.
TIED_SHELL_EDGE_TO_SURFACE is reported as invalid for solid welds.
TIED_SURFACE_TO_SURFACE and TIED_NODES_TO_SURFACE and TIED_SHELL_EDGE_TO_SURFACE_BEAM_OFFSET are reported as invalid for beam welds.

- **Case 10687**

In RC2 it was necessary to press the main 'connection' tool to update the check status of connections shown on the table. This has been changed so that the status is updated:

1. whenever the user calls up the table
2. when the 'refresh' button is pressed
3. after an 'update & remake' operation has been performed.

- **Case 10616**

On some Linux machines sketching of connections from the connection table sometimes didn't work properly. This has now been fixed.

- **Case 10589**

When creating connections for existing spotwelds in a model PRIMER would make a connection for spotwelds whose nodes were used in a *CONSTRAINED_EXTRA_NODE_SET. This is no longer done.

- **Case 10540**

On windows machines using the connections table could sometimes cause the graphics window to go blank until the model is rotated or redrawn. This has been fixed.

- **Case 10342**

PRIMER was inconsistent when checking weld proximity. When creating welds it was looking at the distance between connection points. In model check it was looking at the distance between the average coordinates of the welds.
The behaviour for the create case has been changed so that it uses the average to be consistent. Additionally when creating the proximity test was done for each vertex of a solid weld. This meant that you would get different results for beam and solid welds. This has been changed so that for solids it only looks at the centre of the solid. This is now consistent with beams.

- **Case 10334**

Some columns in the part and connections table were not sorted in the correct order. This has now been fixed.

Bugs fixed in release 9.3 RC2+

- ***Case 11036***

When user presses 'connections' or does a model check PRIMER creates connection entities for any existing solid spotwelds. PRIMER & LS-Dyna expect nodes 1-2-3-4 or 5-6-7-8 to be aligned with the panels. If the solid topology was mis-aligned PRIMERRC2 could crash on some platforms. This has been fixed.

- ***Case 10974***

PRIMER would not always re-use the old entity labels (nodes, elements etc.) when recreating connection entities on the connections table. This occurred if there was an include range set, without regard to the fact that the labelling method was not set to label the items within include numbering ranges. If the method was set to use include ranges, the behaviour was correct.

- ***Case 10934***

When multiple latent part definitions existed on the connection table, it was possible that on remaking all the welds the latent part ids would get confused. This has been fixed.

- ***Case 10933***

*For nugget solid spotwelds with more than two layers, PRIMER RC2 was writing the *DEFINE_HEX_SPOTWELD_ASSEMBLY cards incorrectly. The error has been corrected.*

- ***Case 10930***

You were unable to edit layer 10 information for a connection entity on the connections table through right clicking. Corrected now.

- ***Case 10761***

If a model with connections in was copied, the connections in the new model would be dormant instead of 'realized'. This has now been fixed.
This would also have been a problem if 'add new child' was used to add a new include file.

- ***Case 10626***

When remaking spotwelds in the connection table some could be marked as invalid even if they looked OK. If the layer definitions were swapped over the weld would make OK. This was because PRIMER occasionally got the information for the weld in the wrong order. This has now been fixed.

Bugs fixed in release 9.3 RC2

- ***Case 10584***

If the auto weld function was run directly after connections had been created using the 'update & remake' function on the table, PRIMER refused to make most connections and gave the error 'error creating spotweld info'. This is now fixed.

- ***Case 10533***

Corrections relating to reading UG spotweld files:

1. *Part names are now non-case-sensitive when trying to match with the parts in the model.*
2. *If no spotwelds were successfully read, the connections table will not appear.*
3. *When writing a UG file, if a part has no name, a warning is now given, since this part cannot later be matched in the model.*

- ***Case 10527***

*PRIMER 9.3 RC1 was not correcting *ELEMENT_BEAM_PID definition when shells to which spotweld beams are attached are moved from one part to another. This has been fixed. Note that, as currently programmed, PRIMER will not modify connection layer definitions when the shells connected are moved from one part to another. This is logged as an enhancement.*

- ***Case 10476***

Sketch of connection and its attached parts from the connection table, was not always clearing the sketch of other connections. It has been fixed.

- ***Case 10472***

When remaking the connections in the table the colours used for connections were wrong. Instead of green (realized) and red (bad) the colours were showing as magenta and cyan. This has now been fixed.

- ***Case 10448***

When connection function (or check) is accessed in PRIMER, we create a connection entity for any spotweld which does not already have one. The connection entity was being created in the current layer. This has been corrected to be in the layer of the spotweld element. If the spotweld elements or nodes reside in different includes the user will be given the option of moving them into the include of the first found element.

- ***Case 10447***

Screen-picking of connections in the CONNECTION panel could fail for two reasons:

1. *If CONNECTION visibility was not turned on then the user would be unable to pick them (obviously). But this might not be apparent because if welds or bolts were 'realised' at the connection these would be displayed and - apparently - be pickable.*
2. *Related to the above the user would expect to be able to pick a connection by clicking on the 'realised' item (weld etc) as well as the connection blob symbol itself, but this would not work.*

Therefore prior to screen-picking connections their visibility is tested, and if it is off then it is turned on, the image is redrawn to make them visible, and the user is informed that this has happened. In addition the screen-picking of connections has been extended so that the closest to the cursor position of the connection symbol itself and any item (node, beam, solid, etc) 'realised' at the connection is used. This means that the user can select a connection by clicking on the weld (or whatever is 'realised') as well as the connection symbol itself, provided that the connection symbol is visible.

- ***Case 10392***

A possible crash could occur when changing layer types on the connection table, due to faulty memory allocation. Also change from CADname to PARTname was not supporting possible multiple parts per layer. These have both been fixed.

- ***Case 10383***

When writing UG (unigraphics) format comma-separated files of weld positions from the Connections panel the default part names used ('PIDnnn') if the parts are untitled were not comma-separated. This has been corrected.

- ***Case 10350***

Orientation of connections has been improved, so that if an orient operation moves all the FE items associated with a connection, the entity itself is also oriented. This is the default condition and may be optionally switched off.

- **Case 10345**

When spotweld beams or solids were moved from one part to another using the part contents function, PRIMER was failing to update the connection data to reflect the change. This has now been fixed.

- ***Case 10336***

In PRIMER 9.3 RC1 some spotweld connections could be made even if they were too close to existing connections. This has now been fixed for PRIMER9.3RC2.

- ***Case 10114***

In cut-section plots connections were always drawn even when they were on the "blanked" side of the cutting plane. This has now been fixed.

- ***Case 10011***

PRIMER has a feature to remake connections automatically after a model has been built using the database/template system. This should only apply when a connections .xml file is included in the list of selected files for build. In PRIMER 9.3 RC1 all connections were remade unconditionally, on completion of any model build. This has been fixed in PRIMER9.3RC2. On completion of build, if a connections xml file has been included, PRIMER will now offer the connection table for remake of the selected connections under full user control.

- ***Case 9990***

A possible crash has been observed when checking/accessing connection function in model containing ill-conditioned spotwelds.

- ***Case 9967***

When writing a PRIMER connection file the extension .xml is now automatically added if no file extension is given.

- ***Case 9758***

Under the connection tool, the functions "Find Connected" (panels from weld and welds from panel)and "Find Unconnected" have been corrected to include connection by bolts as well as spotwelds. A bug has also been fixed which could stop the seam options (welds only) from working properly.

- ***Case 9710***

The test to detect a rigid node on a shell to which a spotweld is tied, was sometimes not working correctly when the tied node was close to the edge of the shell. This could mean that a clash of constraints (constrained spotweld vs rigid node) was erroneously reported or failed to be reported. The algorithm which decides to which shell a node is tied has been corrected.

- ***Case 9700***

Invalid connections are now included in model checking function, with an option to display these in the Connections Table.

- ***Case 9677***

Remaking spotwelds, using the connection table, which had errors on material or section cards was resulting in their status being changed to FAILED. This has been changed so that their status is REALIZED (as they have been made) and the error is reported under the error heading.

- ***Case 9648***

If you read a spotweld file (old PRIMER spotweld file) and then tried to use the connection create panel, the panel was not resized correctly. This has now been fixed.

- ***Case 9443***

Sketching of spotweld beams made from connection table was considerably slower than sketching for spotweld solids. This has been fixed.

Contact

Enhancements made in release 9.3

- **Case 11078**

The selector for nodes to fix on the crossed edge fixing panel, has been modified to consider only nodes of the visible crossed segments by default. It can be switched to consider all nodes (as before).

- **Case 11076**

A new check has been added to warn if contact thickness of shell is reduced because of the dimensions of the shell.

- **Case 10831**

Contacts are now drawn semi-transparent when in Shaded Image mode, allowing the underlying elements to be seen as well. This drawing style allows contacts to be drawn much faster than in previous versions of PRIMER (which used hatching). For example, in the Part Tree under Type, switch on Contacts. Turn the action to ONLY. Then, by clicking on each contact in turn, the extent of each contact can be seen quickly.

The display mode used when drawing contacts can be controlled in the Display->Options panel.

- **Case 9868**

PRIMER RC2 used a simple distance check to determine whether a spotweld was correctly tied by contact to its shell. In RC3 this test has been re-written to use the proper tied contact check as used in the penetration checking panel.

- **Case 8030**

Contact penetrations may now be filtered for display using a number of criteria. Pentrations > a given value, those where the remaining segment depth is < a given value. The function can also be used to contour panel gaps within a given range.

- **Case 7322**

Contact penetration function now allows contour of gaps between shells in user defined range up to maximum of 10mm. The function can be limited to only consider shells on free edges.

- **Case 6888**

PRIMER functionality for contact checking, fixing and display has been enhanced.

1. sliding contact can be interrogated part by part
2. gap thickness can be contoured
3. gap thickness can be fixed
4. tied contact can be fixed

- **Case 6620**

Contact penetration calculation now includes the effect of the parameter SLDTHK, which adds 'thickness' to face of solid element.

Bugs fixed in release 9.3

- **Case 12149**

During contact penetration plotting, when only the subset of items being penetrated is being drawn, a subsequent 'quick pick' might select the wrong items.

This was because the visibility tables were not being updated in all cases, meaning that the screen-picking routines believed that items which were previously drawn on the screen were still there.

Whether or not this problem would arise would depend upon the sequence of graphics operations which preceded the penetration plot, so it probably would not occur in most cases. This has been fixed.

- **Case 12140**

Contouring of tied contact which had solids on both sides of the contact was not plotting in contour mode. Solids tied to shells worked OK. This is now fixed.

- **Case 12005**

During contact penetration checking the value of MAXPAR (isoparametric coordinate overlap fraction) was being ignored if set to anything other than the default.

This has been corrected: MAXPAR is now considered if defined. (Note: testing has shown that the penetrations reported from PRIMER, MPP Dyna and SMP Dyna can all be different for a given MAXPAR value.)

- **Case 11993**

Contact penetration plotting caused a crash in a big model on a Linux machine following a complex sequence of operations that included using the Connection table, Contact penetration plotting to view tied welds, and blanking.

The problem was traced to an error in the graphics of contact penetration plotting, and has been fixed.

- **Case 10854**

When the contact checker detected 'node to surface' penetrations (which would include surface to surface 'tied' contact types) the display of these could crash if:

1. The slave side nodes were on solid elements
2. 'Drawn thick' was turned on to show effective contact width

This has now been fixed.

- **Case 10832**

As originally written the plotting associated with the contact penetration checker did not autoscale to just the penetrating segments, meaning that the scale and centring of the plot was sometimes unhelpful (for example if the penetrating segments were a small part of a large model, and off to one side).

The contact penetration panel has since been revised, and has had the ability to select some or all penetrating parts added. If this capability is used then penetration plots automatically show 'only' these items, and also autoscale upon them - effectively solving the problem above.

Therefore the original graphics behaviour has been left unchanged, since it can be useful to see contact penetrations in the context of the whole model.

- **Case 10781**

PRIMER was missing contact penetrations when a thinner shell was meshed onto a thicker one, as segment thickness was assigned at the lower value. PRIMER now uses the MPP method and does not attempt to vary the contact thickness when shells of different section meet. Each segment has a thickness and any penetration is reported.

- **Case 9703**

The contact penetration checker has been adjusted to include the effect of SLDTHK which adds shell thickness to external face of solid elements.

- **Case 9545**

Tied contact check incorrectly reported count of tied nodes in cases where a node penetrates more than one segment. The contour plot also was showing the node as tied to more than one segment. Both these have been corrected by considering the node as tied to the most penetrated segment.

- **Case 9439**

Some inconsistencies developed in PRIMER's determination of penetrating nodes. PRIMER has been modified to try to get good agreement with MMP LS-dyna.

Bugs fixed in release 9.3 RC2+

- **Case 10801**

Checking a CONTROL_SPOTWELD_BEAM card can lead to a crash in PRIMER. Corrected now.

Bugs fixed in release 9.3 RC2

- ***Case 10247***

Where TIED contacts are defined by segment set then both conventional contact penetration checking (detecting tied nodes) and attachment via tied contact in FIND_ATTACHED would fail to work properly. Both problems have now been corrected.

- ***Case 10211***

Edit of existing contact which did NOT have _ID set, showed the contact as if it did have _ID. This has been fixed to show the correct contact status.

- ***Case 10098***

There was an error in the contact penetration check which would lead to contacts on solitary 3d elements, i.e. those on which all faces are external, being ignored. There was an additional minor error, compounding the above, which meant that tied and tiebreak contacts were not treated as pure 'attached at nodes' type contacts for all aspects of checking. These have been corrected. However for the vast majority of models, in which solitary 3D elements do not occur, neither of these two errors would have any effect on the outcome of a contact check.

- ***Case 9748***

PRIMER contact sketch function was sketching whole model when contact type was undefined. This has been changed so that nothing is sketched until the contact type has been defined.

- ***Case 8750***

Option has been added to limit contact penetration count to unblanked elements. This has 3 advantages. It means that the check can be substantially quicker as all elements outside the unblanked region can be ignored. It means that the reported number of penetrations is correct for the unblanked region (this includes those from interaction with blanked elements). It also means that fixing will terminate correctly if all penetrations of unblanked elements (including those with blanked elements) have been corrected. The option is offered to the user.

Contour plotting

Enhancements made in release 9.3

- **Case 11283**

It is now possible to contour Added mass and Percentage Added Mass by PARTS in PRIMER.

- **Case 11073**

Contouring of Effective Plastic Strain defined in *INITIAL_STRESS_SHELL cards is now possible by any through-thickness integration point; as opposed to just the top, middle or bottom integration points.

- **Case 8565**

Young's modulus for relevant materials can now be contoured in PRIMER.

- **Case 4013**

PRIMER can now contour user-specified values in contour and vector plots. The value to be contoured must be defined in the 'Settings' panel.

If the model contains thirteen or fewer distinct values of the entity being contoured, PRIMER assigns an individual colour for every distinct value and generates the contour plot accordingly. In other words bands are discretised into actual values, not a linear ramp of regular increments

If the model contains more than thirteen distinct values of the entity being contoured, the contour ramp reverts to a linear progression with equally spaced intervals covering the required range.

Bugs fixed in release 9.3

- **Case 11422**

Time steps for models with composite shell elements are now computed accurately in the 'Timestep' contour plot.

- **Case 10866**

Contour plot of plastic strain (as defined on *INITIAL_STRESS_SHELL card) was incorrectly omitting to contour any shells on which the plastic strain had been set to zero. This has been corrected.

Bugs fixed in release 9.3 RC2

- ***Case 10500***

When a 'vector' plot of contoured lumped mass data values was performed, the ordinary display of mass symbols (using wireframe boxes) was inhibited. This could result in their failure to display in subsequent (non contour) drawing operations. As the user can suppress or permit these by using the standard 'entity' switch, the unnecessary inhibition has been removed.

- ***Case 10460***

*If a vector plot of velocities was drawn, and only rotational vectors were displayed (by turning off the display of translational ones in the 'settings' panel) the vectors drawn were correct, but the contour bar still showed the translational values. In addition the 'settings' panel treated display of *VELOCITY_RIGID only as an error. Both problems have been corrected.*

- ***Case 10181***

On Windows 32 and 64 bit platforms the contour bar for initial velocity plots can (depending on the user settings) show zeros even though velocities exist and are drawn.

Bugs fixed in release 9.3 RC1

- ***Case 9416***

Some rigid element defaults for contouring have been corrected.

Copying

Bugs fixed in release 9.3

- **Case 12044**

With multiple AIRBAG_REFERENCE_GEOMETRY cards in the model, the option for these cards (_BIRTH, _RTD etc) could get changed randomly when carrying out a copy operation on these cards. Corrected now.

- **Case 11628**

Some functions involving model copying could reset the current layer of the model involved to the master file. This has been fixed, the current layer will remain unchanged.

- **Case 11280**

'Copy Existing' did not work correctly for *DATABASE_CROSS_SECTION edit panel. Corrected now.

- **Case 11203**

If a shell part was copied recursively, creating a new part, the graphics of the new part would not show any free edges.

This was due to a failure to recalculate these, and has now been fixed.

Bugs fixed in release 9.3 RC1

- **Case 9078**

Certain model copying operations, such as copy and translate, were creating duplicated DAMPING_FREQUENCY_RANGE cards. This is an error where the parts set id is zero.

Cross-references

Enhancements made in release 9.3

- **Case 11210**

In the cross references editor you can now do 'Only' on an item as well as 'Blank' and 'Unblank'. Additionally all 3 options are now available for the type branch as well as each item.

Bugs fixed in release 9.3

- **Case 9966**

If the cross-references editor when first opened contained too many entries to be displayed without a vertical scroll-bar then the scrollable area would remain empty until the box was resized to make it large enough to do away with the scrollbar. This would only be likely to happen to very 'popular' items with a lot of x-refs on a small display. This has now been fixed.

Bugs fixed in release 9.3 RC1

- ***Case 9339***

If the user deleted items in a model while using the cross reference viewer it was possible that the cross reference viewer could show 'junk' values for the items that had been deleted. This has now been fixed.

Database (including Model build, etc)

Enhancements made in release 9.3

- **Case 11025**

The model build from .csv option now has an option to sort out label clashes between the model and the impactor by renumbering offending labels.

- **Case 9977**

Model build option for selecting database has been set to 'use last loaded'. Thus users can perform multiple model build operations in the same PRIMER session with PRIMER 'remembering' the last database loaded.

- **Case 9438**

PRIMER now allows users to build models interactively using .csv files. A Model and an Impactor, or an existing .csv file can be read in. Orientation depenetration operations, load case rows, and other parameters such as Reporter template names and target directory can then be specified. Users can then proceed with the model build.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10117***

When creating a model database from a directory the file extensions '.key' and '.k' are now case insensitive. '.dyn' extension is also supported.

Enhancements made in release 9.3 RC1

- ***Case 9536***

PRIMER now supports read/write of CAD names for parts (from Bill of Materials), storing the special comment $PR_CADNAME in the keyword deck. This is intended for use with Connections or Spotweld files.

Bugs fixed in release 9.3

- ***Case 11475***

Unix PRIMER will not accept template file names with spaces in them for the template panel. Such names are ill conditioned for Unix.

- **Case 11474**

Write master file from model build could write a keyword file name longer than the permissible 80 characters. The function has been corrected to split long include file names up with continuation character.

- **Case 11451**

PRIMER could miss out writing include information to a master file during a model build process due to latent entities being in the model. This has been corrected.

- **Case 10959**

When adding a comment to database history in model build, some text editors do not insert the necessary carriage return on the last line. This could lead to a corrupt database history file. In RC3 the carriage return is explicitly added in the code.

- **Case 10958**

Model build and write, in 'master only' mode was writing include file paths in the native mode, i.e. ignoring the user's setting of Unix or windows mapping. This has been fixed.

- **Case 10219**

Writing of master file only from model build now offers the options for include file handling. Previously it was hard-wired to absolute path.

Bugs fixed in release 9.3 RC2

- ***Case 10371***

Bill of Materials could change parts erroneously, if auto-detect columns was on. Consider the following file:

```
Vehicle X,Bill of Materials version,8.6,Date,20/02/01,,
Part No,Title,Part ID,Material,Supplier,Gauge,Part  mass
AA51201,sill_swan_neck,5,HP37 ,Company X,2.2,9.64E-03
```

PRIMER would auto-detect the column headers from line 3 then when reading the file it would try to read line 1, reading part ID 8 and hence changing the name, material etc. PRIMER will now ignore any lines before the line used to auto-detect the columns.

Bugs fixed in release 9.3 RC1

- ***Case 9163***

When creating a model build database by manual edit, category names for keyword type items are now automatically generated from the branch above. The user only enters the subcategory name.

Dummies (including FMH, Mechanisms, Seatbelts and Seat-squash)

Enhancements made in release 9.3

- **Case 12013**

The 'dummy angles file' (extension .daf) that was added in release 9.3RC1 has been modified as follows:

1. Comments at the top of the file are remembered and reproduced when a new file is written.
2. The file now uses simple Euler angles (theta X, Y, Z) instead of direction cosines for positioning assemblies.
3. If an overall rotation of the whole dummy has been performed then the angles from this are also included.

- **Case 11911**

In MECHANISMS child assemblies could historically only be linked to their parents by some permutation of translational degrees of freedom.

This has now been extended so that (all) rotational degrees of freedom may also be linked, with or with some permutation of translational ones.

In addition there is now a 'fully locked' option which merges the child(ren) into the master, forming a single rigid body.

- **Case 11854**

A very simple command-line syntax to refit seatbelts has been added, making it possible to refit belts in batch mode.

- **Case 11510**

Auto vertical angle feature added to the auto build from CSV file for FHM models

- **Case 11207**

There have been requests that items in *INCLUDE_TRANSFORM definitions should be usable inside mechanism or dummy positioning in such a way that the original (untransformed)

coordinates of the items are preserved, and the positioning transforms are added to the *DEFINE_TRANSFORM definition instead.

This has been implemented as follows:

1. PRIMER detects automatically that items within an assembly are in an *INCLUDE_TRANSFORM definition.

2. It assumes that this has been done intelligently: all the items are in a single assembly, and the *DEFINE_TRANSFORM for these items is used uniquely by this *INCLUDE_TRANSFORM definition.

3. Positioning proceeds as normal, but when a revised position is ACCEPTed the transform is appended to the end of the *DEFINE_TRANSFORM definition as a block of four transformations:

   TRANSL [x,y,z] To shift to the new position
   ROTATE [theta X] Rotation about global X axis
   ROTATE [theta Y] Rotation about global Y axis
   ROTATE [theta Z] Rotation about global Z axis

– Within a PRIMER run the location of this block of transforms is 'remembered', and any further positioning causes the original set to be replaced by a new set of definitions giving the updated position.

– There is no way to record in the input deck that a given block of 4 transforms apply to positioning, so once a deck is written out (or copied to a new model) these become permanent, and any positioning operations in the new model will create a new block of transforms.

Because the 'as transformed' coordinates will, when the inverse transforms are applied prior to keyword output, go back (give or take a small error) to their original positions, the include file is preserved in its original state.

- **Case 11204**

The following changes have been made to Mechanisms:

1. The default initial angle of a mechanism assembly still starts as zero degrees (since a new assembly has no intrinsic orientation). However as it is rotated these (notional) angles about all three axes are now updated, and the values are 'remembered' both across positioning runs and in the keyword output file.

2. 'LINE' and 'HINGE' connections between assemblies now compute and remember their relative angles at all times. Previously this was only done if 'stop' angles were defined. In addition the current angle (by default initialised to zero degrees) can be both set to some other value initially, and also reset at any time.

3. The 'stop angles' for LINE and HINGE joints were previously limited to 0.0 to +180.0 for +ve, and -180.0 to 0.0 for -ve.

These limits are now relaxed, and both angles can lie in the range +180.0 to -180.0 degrees, the only limitation being that the +ve angle must be greater than or equal to the -ve angle. In addition the current angle should lie between these two limits.

- **Case 10805**

There has been a request to read and store comment lines in the dummy (positioning) angles file (.daf file).

Because of the free-format nature of the file it is not possible to read and write arbitrary comments, however the following limited support has been added to the .daf file:

1. If any non white-space comment lines are found between the file header (the '$ Model title:' line) and the start of data ('$ H-Point' line) then these are stored.

2. In the keyword deck there is a new (optional) *COMMENTS header in the DUMMY section (after *END) which may contain any number of 'comment' lines. These are pure text lines, not interpreted in any way, and should *not* start with a '$' otherwise they will be ignored!

3. Comments read/written from keyword deck and/or .daf files are inter-changeable. Reading comments from one source deletes and recreates the comment line(s) entirely.

There was a further request that these comments should include 'point' information, and that this should be editable inside PRIMER. This has not been implemented since dummies already have points for mechanism-style positioning, and adding a further layer of these would cause confusion.

- **Case 10298**

Blanking by mechanism did not do anything in the default 'non recursive' mode. This was due to a simple omission, and has been fixed.

Blanking a mechanism will now blank all the constituent parts, part sets and nodal rigid bodies that make it up. (Note that blanking a dummy will likewise blank the dummy's assemblies.)

- **Case 10060**

When creating child definitions for a mechanism the default is now to have all three translational degrees of freedom coupled.

Previously none was set and the user had to specify something in order to make the definition.

In addition the various dummy and mechanism 'child' editing/creation panels (assemblies, connections, points, children) now all adhere to the standard PRIMER logic that definitions which are missing are highlighted in red, and references to latent items are in light blue.

- **Case 8711**

If a FMH headform is not in the zero rotation position, but rotated to a certain position through the FMH functionality, Primer will now test for this before any automatic positioning process and take it into account.

- **Case 7602**

Primer now has improved FMH positioning functionality. The main additions are an automatic vertical angle positioning tool, which will rotate the headform until the chin touches the trim, and then rotates back by 5/10 degrees (or some other user defined value). It is also possible to set a positional node that can be used for automatic headform positioning and headform rotation. This node is used as the reference point rather than the headform reference node.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10868***

The command line (and therefore also 'batch') MECHANISM and DUMMY commands now have a top level POSITION command that allow a previously saved position to be restored.

- ***Case 10793***

The Occupant Seatbelt 'auto refit' capability has been enhanced so that it can now reuse the labels of the elements, nodes, sets, etc that made up the old belt definition. (Many users like to control their item labels within tightly defined ranges, which made the old method of using 'next free' labels unsatisfactory.)

In addition the following enhancements have been made:

- *Belt fitting (generally) should run faster due to improvements in the form-finding algorithm used.*
- *In the refit panel a new option has been added to transfer nodes, shells and belt elements in Time History blocks from the old mesh to the new.*
- *The automatic recreation of belt to dummy contact following belt refitting now works*

- ***Case 10070***

Mechanism assemblies in PRIMER 9.3 RC1 permitted definition by Part, Set Part and Constrained Nodal Rigid Body. Use by clients has revealed that it would be preferable to replace the nodal rigid body definitions with Set Node ones, since these give a more generally useful way of incorporating arbitrary lists of nodes into mechanism assemblies. Therefore nodal rigid bodies have been removed from mechanism assemblies in PRIMER 9.3 RC2, and replaced with node sets. Any decks using nodal RBs can easily be fixed by replacing the nodal RB label with the label of its underlying node set.

In addition Dummy assembly definitions (which did not previously permit nodal rigid bodies) may now include Set Node definitions. These have been added in a backwards-compatible fashion so existing dummy tree files will still function correctly.

- ***Case 10069***

The dummy / mechanism positioner in PRIMER 9.3 RC1 ignored all parts made of null shells during positioning, on the assumption that these would be 'skinning' parts for contact. However some dummy modellers create target markers from null shells, and attach them to the dummy using tied contacts. These got 'left behind' during positioning. Therefore null shell parts are now included in the assembly positioning process if none of their nodes are 'structural'. This means that their nodes must not be shared with any non-null elements on the assembly.

- ***Case 10019***

Seatsquash has undergone the following improvements:

1. *The maximum number of iterations is now user defined.*
2. *When using the LS-DYNA method, it is now possible to keep some parts of the dummy deformable.*
3. *When using the PRIMER method it is now possible to reset the dummy and foam nodes to their initial positions if the compression process fails.*
4. *Iterative mesh improvement for tetrahedra has been added, to prevent elements being flattened during the foam compression process*

- ***Case 9951***

Some improvements have been made to the belt fitter:

1. *Hover text has been added to main buttons, giving a clearer indication of some of their functions.*
2. *Internal flagging of 'belt' items has been corrected so that deleting a 'belt' definition will also delete seatbelt and shell elements, contacts and nodes created during belt fitting.*
3. *Some internal data was not getting reset correctly between successive belt fitting operations. This could lead to references to invalid seatbelt and shell parts being generated during the meshing phase.*

- ***Case 9840***

*The ability to limit the permitted rotation angles of mechanism HINGE and LINE joints has been added. By default these are unlimited, i.e. permitted to rotate 180 degrees, both +ve and -ve limits may be set. Keyout files containing mechanisms created in PRIMER 9.3 RC1 can be read by the new release, with the permitted rotations defaulting to unlimited, however *MECHANISM keywords in PRIMER 9.3 RC2 output files will not be backwards compatible to PRIMER 9.3 RC1.*

- ***Case 8089***

*It is now possible to refit a seatbelt very easily following movement of a dummy. So long as the belt was previously fitting in PRIMER, i.e. there is a *BELT keyword after *END containing some belt path information, a seatbelt can be refitted to the revised dummy position by clicking on Occupant > Seatbelt > Auto-refit. This takes the original belt path, projects it to the revised dummy position and refits the belt. It uses the same belt properties and layout as before (ie mix of shells and belt elements). It also looks for the original retractors and sliprings (if present) and re-uses them if possible.*

The path produced by the belt positioner has also been improved so that it converges faster and is more likely to give a realistic straight line between fixed/contact points.

Enhancements in release 9.3 RC1

- ***Case 9630***

When dummies are positioned any assemblies without a parent, implicitly 'root' assemblies, now have their orientation angles reported in the dummy's axis system. Where this system was not defined the global Cartesian system was used, leading to angles changing if the dummy as a whole was rotated.
To get round this if no dummy axis system is defined a default one, initially aligned with the global Cartesian axes, is set up and used for calculating 'root' assembly angles. Since this system rotates with the dummy, angles now remain the same despite any global transformations, giving a consistent interface to the user.

Bugs fixed in release 9.3

- **Case 12032**

When Mechanism positioning was added to PRIMER 9.3RC1 the ability to 'slave' occupants (dummies) to mechanisms was included. In the process of doing this the way in which dummies are manipulated had to change internally, and some errors crept into this process. They would only show up if the occupant was rotated to some arbitrary orientation, and would appear as errors in computing root assembly angles. These have now been fixed.

- **Case 11992**

When MECHANISMs were added to release 9.3 they were integrated with the existing DUMMY capability, and one enhancement was that once a DUMMY had been positioned the reference orientation of each of its assemblies would be written to any subsequent keyword output file.

However this failed to take into account any rotation of the dummy as a whole, meaning that if a dummy was rotated prior to positioning its limbs, the model was written out, and then - crucially - read back into PRIMER for further positioning, the angles of the root assembly reported in the dummy positioning menu would be wrong.

This wouldn't affect the actual dummy position or geometry, only the reported angles.

This has now been corrected by testing prior to output whether the dummy as a whole has been rotated and, if it has, adding its current orientation as an optional 3 rows to the *H-POINT card of the *DUMMY definition.

This change is backwards compatible with existing decks, since if these extra 3 lines are absent then a unit matrix (i.e. no whole-body rotation of the dummy) is assumed.

- **Case 11909**

If a DUMMY definition was put on the clipboard and then saved to another model then, unless only nodes and elements were used, a range of errors would be generated and the save operation would fail.

This was because a transient 'bare' dummy definition without its associated parts, sets, joint stiffness's, etc was processed as part of the copy operation generating errors which were not representative of the ultimate 'populated' definition.

This problem has been fixed, and dummies will now copy correctly via the clipboard. In addition the checking of dummies has been improved in that they are now included in a Model > Check operation, and the connectivity checks which were previously only performed when a dummy was read in are now repeated during a 'check' operation.

- **Case 11565**

In previous versions, Primer could refuse to read in a model containing FMH data if Primer defined headform positions for a single target point have been removed with labels lower than the currently set position for that target point. Corrected now.

- **Case 11539**

Historically Mechanism and Dummy positioning did not 'know about' any connections present on the elements of their assemblies, meaning that, for example, connection-based spotwelds would get 'left behind' when assemblies were positioned.

This has now been corrected. When a mechanism or dummy assembly is positioned it will also move any connection points; and any welds, bolts or adhesives which have been created at these connection points will also be moved. In other words the effect is as if the connection and any elements arising from it are tied to the assembly.

There are two qualifications to this:

1. The connection must have been 'realised' prior to positioning, in order to create the association between the connection coordinate and the elements of the assembly.

2. Each such connection is positioned as a whole. Therefore if a connection spans two assemblies the outcome will almost certainly be wrong, and this situation should be avoided. In other words a connection point within a mechanism or dummy should lie unambiguously on a single assembly, and not attempt to connect two of them together.

- **Case 11482**

In mechanism positioning it was possible to end up with continuous rotation if the absolute value of the difference between <current angle> and <target angle> was more than 180.0 degrees as measured taking the route through 0.0.

(This is analogous to moving from 8 o'clock to 4 o'clock via 12 o'clock, which is an angular change of +240 degrees, rather than via 6 o'clock which is a change of only -120 degrees.)

The algorithm has been changed so that the route taken from current to target position is always the shorter direction around the clock, i.e. the magnitude of he angular change is always <= 180 degrees.

This solves the 'infinite rotation' problem, but it does mean that if the user wants a rotation to proceed the 'long way around' from current to target position this will have to be achieved by two consecutive rotations, each with an angular change of less than 180 degrees.

- **Case 11456**

In Mechanisms it is possible to set limiting +ve and -ve rotation angles for LINE and HINGE joints. If these were both set to the same value, with the intention of locking the joint in rotation then PRIMER struggled to converge.

This was due to over-correction for these stop angles, and has now been fixed. If the +ve and -ve limiting rotation angles are set to be the same PRIMER now locks the joint against rotation, but still permits sliding in the case of the LINE joint.

- **Case 11220**

Primer belt fitting definitions did not show their names in the general selection menus ('object menus'), only their number.

These names now appear, and the names for a few other categories that did not previously appear have also been added.

- **Case 11212**

Prior to release 9.3RC3 the 'dummy angles file' used to transfer dummy configurations between models worked using direction cosines rather than joint angles. This had the effect of embedding existing assembly configurations into the process, making it difficult to transfer angles to a different model that was not geometrically identical.

From release RC3 onwards this has been changed so that the Dummy Angles File now works solely in terms of joint angles, which should make it easier to transfer configurations between dissimilar models.

- **Case 10874**

If a model contains multiple dummies or mechanisms; and some parts, set_parts or set_nodes are used in more than one dummy or mechanism, then the dummy input may fail because it believes that these parts / set_parts / set_nodes are illegally in multiple assemblies within itself.

This error arises because the test for assembly membership does not check the 'owner' of each assembly, so it picks up multiple membership across multiple mechanisms / dummies when it should not.

In most cases reading in the *DUMMY definition before any *MECHANISM ones will cure the problem. This has been fixed.

- **Case 10856**

Some dummy models would get 'stuck' when being positioned as mechanisms.

This would tend to occur when joint stiffness's were used, the rotation angle about the joint Y axis was permitted to reach the angle + or -90 degrees, and the other axes of rotation were clamped.

The problem was due to problems calculating rotation angles at this point and has now been fixed.

- **Case 10797**

When explicit angles were used to define rotations in 'Rotate angles' mechanism positioning things could go wrong if the angles given were outside the range +/-90 degrees.

Symptoms might include failure to achieve the desired angle, or achieving the wrong angle (arriving at the mirror 'wrong side' of +/-90 degrees value) or even an endless loop of continuous rotation! These problems have been fixed.

- **Case 10735**

It is now possible to abort from a seatsquash to set up a DYNA analysis during the iteration phase and return to the previous step if you make a mistake.

- **Case 10691**

During seatsquash, if extra parts were selected for the top and/or bottom surfaces of a seat by mistake and they were not actually on the surface of the seat this could cause the seatsquash to go wrong. This has now been fixed.

- **Case 10690**

The stop button can now be used to stop seatsquash while iterating.

- **Case 10609**

A dummy with a seatbelt definition in which the '*BELT' structure was in an include file which was read before the dummy structural elements were read failed to auto-refit the belt correctly when the dummy was subsequently moved.

This was due to an error in the sequence of operations, as the belt definition attempted to find the nodes closest to the skeletal belt path before they had been read in. Changing the order of the include files solved this problem.

It has been fixed permanently by deferring the search for belt path 'nearest nodes' until after all input has been read, making the auto refitting of seatbelts independent of include file and keyword order.

Bugs fixed in release 9.3 RC2+

- ***Case 10753***

Command-line mechanism and dummy positioning would fail, getting stuck in an endless loop, if it was carried out without having first used the GUI 'Mechanism' command. This has now been fixed so that 'pure' batch positioning, with no graphics use interface usage, now works correctly.

Bugs fixed in release 9.3 RC2

- ***Case 10576***

If a mechanism or dummy assembly contained an empty part or node set then it could become hard to drag because its centre could be calculated wrongly. This has now been fixed.

- ***Case 10468***

If an attempt was made to fit a seatbelt to a 'structure' that did not contain any 2D or 3D elements then a crash would occur. This has now been fixed.

- ***Case 10363***

During seatbelt meshing (in the seatbelt fitter) the explanation of optional 'end nodes' on a belt segment was sketchy, and led users to the conclusion that these were additional nodes. This has been tidied up, the selection method has been improved, and an explanatory text added.

- ***Case 10299***

In the Dummy and Mechanism 'Assembly' editing panels added in PRIMER9.3RC1, the code would crash if a zero or an invalid (eg -ve) item label was put into the 'next item' (green) data entry fields for Part sets, Parts, Node Sets of child assemblies on those panels. This has now been corrected.

- ***Case 10192***

The seatbelt fitter could get confused in some unusual situations where consecutive pairs 'fixed' points followed one another closely. This resulted in a wrong, and very strange looking, initial path. This error has been fixed.

In addition the fitter has been enhanced to include the concept of a 'known' basic belt path point. The final belt path is forced to pass through this point, but (unlike the existing 'fixed' point logic) no break in the mesh occurs. This permits belts to be 'pinned' to a particular location on a dummy or structure.

- ***Case 10189***

If you were doing a seat-squash using the LS-DYNA analysis method and your model did not contain any other contacts than the one used for the seat-squash, the 'Next' button was greyed out in the step that allowed you to delete redundant contacts. This meant that you couldn't continue. This has now been fixed.

- ***Case 10157***

When creating a Part for seatbelt elements, it became possible to choose incompatible section and material types. The choice of section type and material model is now confined to the relevant type, as was the case in release 9.2.

- ***Case 10111***

In release PRIMER 9.3 RC1 the Save/Retrieve Position panel under the Occupant Dummies menu, used to store and retrieve dummy positions, would have been likely to be mapped at the wrong scale, or without scrollbars or - at worst - with no buttons showing at all. It could be fixed by a window resize operation. This has now been fixed.

- ***Case 10105***

In the Mechanism and Dummy positioning panels, under the 'Move Points' sub-area, if the user defined a node as a target position its label disappeared again immediately (although the move worked). In addition in the Dummy panel screen-picking a node as a target position did not work.

Both problems have been fixed: node labels now persist for the duration of the move operation, and a screen-picked node now works as the target of a move in the Dummy menu.

- ***Case 9993***

If a mechanism or dummy was edited immediately after moving something to an include using the clipboard, without any intervening operation, a crash could occur. It has now been fixed.

- ***Case 9981***

If you CREATE a new dummy (tree structure) interactively, and then attempt to CREATE a new assembly in that dummy PRIMER will crash. This has been fixed in PRIMER9.3RC2.

- ***Case 9841***

Users who put Parts, and hence many structural nodes, in multiple assemblies of a mechanism, which is an error, had to wade through long listings of these nodes before they got to the list of parts. This made it difficult to diagnose the problem, so the order of listing in the error output has been swapped round to show parts first and then nodes. This should make it much easier to diagnose errors.

Bugs fixed in release 9.3RC1

- ***Case 9436***

The csv target file written from the FMH module has been corrected to write the tag 'rootname' rather than 'root'. Additionally, the model and impactor name (previously left blank) are now written.

Editing (Specific panels and generic keyword editor)

Note that the generic “Keyword Editor” has been completely re-written for release 9.3, thus many of the cases referring to it in RC2+ and earlier are of historical interest only.

Enhancements made in release 9.3

- **Case 11735**

There was a request to add a filter option for PARTs to show only those parts which were empty, ie which didn't contain elements.

A new filter option 'By Content' with the options 'Populated' or 'Empty' has been added for PARTs and SETs.

IN addition to adding this very specific and limited filter two further general options have been added as well:

1. Referenced by type.
2. NOT referenced by type.

Both are initially inactive, but if a <type> is chosen from the first option then only those items in the target menu which are referenced by objects of that <type> are shown.

The second is the logical opposite of this: if a <type> is chosen then the target menu only contains items which are *not* referenced by objects of this type.

Since 'generic' categories are provided as candidate types (eg ELEMENT, SET, etc) then the 'filter by empty parts' that was the original subject of this request could be performed by selecting

3. By NOT Reference ELEMENT

Which would eliminate any parts that contained elements.

- **Case 11706**

Created a 'Convert to implicit' button which takes the current model and creates control cards for the type of implicit analysis you require. Also, material card and hourglass cards are created for the implicit analysis based on the existing cards.

- **Case 11657**

PRIMER now supports the new keyword - *INITIAL_AXIAL_FORCE_BEAM. A keyword editor for the same has also been added.

- **Case 11287, and many others**

The revised generic keyword editor solves many problems arising from its previous form, in particular:

1. Sub-keyword suffices can not be changed (eg from *PART to *PART_INERTIA).
2. Sub-types with different sub-keywords can be shown and processed together.
3. Entries can be moved between include files.
4. A single mode replaces the previous (separate) Edit, Create and Delete modes.
5. Operation on multiple rows is now much easier and intuitive

- **Case 10980**

For CONTACT, NODE and PART (keyword) buttons, the left mouse button will now activate the most commonly used keyword for that type. The right mouse button will give the pop-up list of different types as it does currently, making it possible to select the more obscure sub-keyword types.

- **Case 10979**

A simple function has been added which allows the user get a report from the dialogue box of the total mass of *ELEMENT_MASS selected from the object menu.

- **Case 10947**

The problem of running out of flagging bits has dogged PRIMER for some time.

It has not proved possible to solve the problem completely, but the usage of these for certain common operations has been reduced and, hopefully, this will reduce dramatically the number of times users see the 'run out of flagging bits' message when attempting to start some new function or panel.

- **Case 10731**

Hover text has been added to the model (M1 etc) button to display current file name.

- **Case 10665**

PRIMER now prevents the usage of MAT_ADD_PERMEABILITY with elements other than solids.
PRIMER now prevents the usage of BOUNDARY_PORE_FLUID with parts containing sections other than SECTION_SOLID.

- **Case 9950 (see also 10947)**

Some changes have been made to reduce the number of reserved flagging bits required by connection table. Users should find that they encounter the 'operation failed due to running out of flagging bits' warning less often.

- **Case 9877**

Keyword editor now allows switching between keyword options, e.g. *ELEMENT_SHELL_BETA to *ELEMENT_SHELL and vice-versa

- **Case 9610**

Under 'options' there is a drop down to list the available shortcuts. (The same listing is available using the “?” short-cut key.)

- **Case 6439**

Field 'A' of material type 98 are now contoured as Yield stresses and are reported as such in the Part Table.

Enhancements made in release 9.3 RC2/RC2+

- *Case 10314*

The SET editor for SET_SEGMENT has been improved in the following ways:

- *New sets can be created as both ordinary (no suffix) and _GENERAL types. Previously only _GENERAL was available.*
- *Adding segments to an ordinary segment set by coating elements has been made more intuitive. The operation can be repeated multiple times, each pass adding segments to the set. Previously this could only be called once and always created a new set.*

Bugs fixed in release 9.3

- **Case 12284**

Allow -ve <memory> flag for CTRL_SPH.

- **Case 12280**

PRIMER was incorrectly restricting use of Equation of state for parts which define SPH elements. This has been fixed.

- **Case 12186**

PRIMER could crash when attempting to drag a DATABASE_CROSS_SECTION through the edit panel for this card, if no data was entered to define the section (all fields zero). Corrected now.

- **Case 12110**

PRIMER allows *CONSTRAINED RIVET, SPOTWELD and GENERALIZED_WELD cards to be edited 'multiply', by selecting a group and changing common fields.

This functionality worked, but the internal process used to select the group was programmed in such a way that multiple entries could be selected by some completely different operation, which would result in a supposedly scalar edit also applying to welds it shouldn't.

In addition the node editing panel could (rarely) generate a misleading title saying 'Editing nnn nodes' for much the same reason, although no harm would arise from this. Both problems have been fixed.

- **Case 12039**

When dragging a plane in cross section editor the labels on the plane triad were drawn in white instead of 'not background' colour. If your background was white they could not be seen. This has now been fixed.

- **Case 12008**

Deleting points in the loadcurve editor when a scrollbar was used could cause the scrollbar to function incorrectly. This problem has now been fixed.

- **Case 12004**

When opening a define curve edit panel, where that define curve also has a define curve feedback association, the user may get some db_put error messages. This has been corrected.

- **Case 11974**

Changing LENL or LENM in the database cross section creation panel when auto-create was on would cause PRIMER to hang. This has now been fixed.

- **Case 11963**

The DAMP field for material types 57 and 73 is a loadcurve of damping vs compressive strain if -ve, but PRIMER only permitted a +ve value to be input. This has been corrected, and a negative value is now treated correctly.

- **Case 11868**

The part contents function has been modified in response to graphics crash which occurred when a user removed elements from a part and then aborted deletion. Such action left model xrefs in disarray. Users now have to re-parent removed elements (by entering id of another part) or apply the deletion. If deletion is aborted, the user is returned to the add/remove actions panel.

- **Case 11863**

There were two problems with *MAT_NONLOCAL processing:

1. On the interactive editing panel the 'L' value was interpreted as an integer instead of a floating point value, resulting in a ridiculous value being shown. (Internally this value was read, processed and written correctly.) This has now been corrected, and this data field appears correctly in the editing panel.

2. On keyword output 6 rows of symmetry plane data were always written, even if they contained all zeros. This upset ls-dyna since a plane with identical 'origin point' and 'point on vector' coordinates is illegal.

Symmetry planes on this keyword are now only written if they have at least one non-zero C1 or C2 value.

- **Case 11841**

When editing a triangular shell element in PRIMER in the standard edit panel, the pop-up on the 4th node (which is the same as the first) would not work correctly. In some cases, for example trying to edit this node through the pop-up, PRIMER would crash. Corrected this by not allowing the user to edit this node.

- **Case 11823**

Normally when something new is created in the generic keyword editor, and the visibility of that item (entity switch) is off, then PRIMER blanks all existing items that type, unblanks the newly created one, and then turns on visibility so that only the new items is visible.

This requires an internal lookup by label, and this could fail to work for intrinsically unlabelled items (e.g. *Boundary_xxx, *Initial_xxx, etc) if the newly created definition did not have the same label as the scratch 'template' on the keyword editor's entry row.

Normally these (internal) labels would match, but if the user deleted one or more definitions before creating a new one then, depending on the sequence of operations, a mismatch could occur resulting in the newly created item being blanked.

This has been fixed by using a more rigorous method of ascertaining the internal label of the newly created item in these cases.

- **Case 11778**

Editing panel for *DATABASE_CROSS_SECTION: The item pop-up menu for field 'ID' now corresponds to option 'ITYPE'.

- **Case 11740**

When typing in TENSR row values in the keyword editor for *INITIAL_STRESS_SHELL, these values could incorrectly appear elsewhere on the card as well. Corrected now.

- **Case 11737**

The first field of the editing panel for keyword *LOAD_BLAST has been changed from 'YLD' to 'WGT'.

- **Case 11639**

In the generic keyword editor (for any item type) labels of items could get confused if the following sequence of operations was performed:

1. Create a new item
2. Revise the label of this to some other (unused) label

3. Create another new item using the label originally used in (1)

In this situation the label clash checking logic would make mistakes, resulting in the two items above having the same label. This has now been fixed.

- **Case 11607**

*CONSTRAINED_NODAL_RIGID_BODY: Options '_SPC' or '_INERTIA' are now added to successive cards when they are created using the 'Auto create' option in the keyword editing panel.

- **Case 11596**

When the 'Auto Generate Layers GO' button is clicked in the *INTEGRATION_SHELL keyword editing panel, the layers are now correctly produced in the ascending order of coordinates of integration points.

- **Case 11480**

PRIMER RC2+ could crash when id of node set was entered in the element_mass edit panel. This is fixed.

- **Case 11405**

The loadcurve editor could lose a point if when creating the curve, the check found an error and the user aborted the create. This has now been fixed.

- **Case 11213**

In the material editor loadcurve/table fields that could have both +ve and -ve curve ids (e.g. on Mat 83) did not have drop-down menus for selection, etc. Instead the user needed to click on the acronym button above the data field to get separate +ve and -ve options.

The drop-down has been restored to the data field, but it suffers from the limitation that it will only insert +ve values. If the user wishes to have a -ve curve/table id he will have to insert the '-' sign manually.

- **Case 11194**

The Group editing panel has been corrected so that when items are defined by range these are treated exactly as entries on a SET_GENERATE card, i.e. they are integers independent of any model operations. Previously these were latent item entries which gave the wrong behaviour under renumbering.

- **Case 11128**

The delete option for part contents (part->edit->contents) was removed in RC2 as it was possible to corrupt the model data by aborting the delete operation. In RC3 the delete function has been restored (as requested by a user) and made to work in a more robust fashion.
The 'do not move' option has also been removed as this did not work. To complete the update, elements must be deleted or moved into another part.

- **Case 10622**

Nodal rigid body creation panel was not clearing sketch of old picked nodes when user did 'reset all'. This has been fixed.

- **Case 10569**

For BOUNDARY_PWP the two loadcurves in the first row are now optional.
The _NODE and _SET options support all fields other than TABLE
The _TABLE option supports typeID, CMULT, TBIRTH and TDEATH, TABLE

- **Case 9864**

PRIMER now allows users to select a label for a new node when they attempt to create one at:

1. 1 - The centre of a circle
2. (or) - The centre of a hole

Previous versions of PRIMER would automatically assign a label to the new node that would be one greater than the highest used.

- **Case 9744**

If multiple models had been read in, but only a single model was active (in Model, List) then it was still necessary to prefix item numbers with a 'Mn/' prefix when typing explicit labels into text boxes in contexts such as Measure, etc.

This has now been fixed: is only a single model is active then, regardless of how many models are in the database, the 'Mn/' prefix of the single active model is assumed automatically.

- **Case 7120**

Auto node selection in element create menu has been significantly improved when picking nodes on solid meshes.

Bugs fixed in release 9.3 RC2

- ***Case 10612***

In editing panel fields for load-curves (or tables) a precision error could occur if an integer value of 8 digits length was typed in. For example label 40000022 would be altered to 40000024. This would only occur if values were typed in, and only if they were extremely large. Selection of curves from the popup menu was unaffected. This has now been fixed.

- ***Case 10603***

In the ELEMENT editing panel the COPY_EXISTING button would appear to work but would in fact do nothing, and just reset the element to its original, pre-edited state. This has now been fixed.

- ***Case 10595***

*In the *INCLUDE_TRANSFORM panel the 'Set all offsets to' text box acted immediately to reset all values if used. This meant that someone 'tabbing' through the panel from text box to text box could accidentally use it, and reset everything by mistake. The panel has been changed to make the text box just collect an offset value, and a separate button to apply it has been added. Since 'tabbing' does not invoke 'buttons' this solves the problem.*

- ***Case 10594***

*4 noded *ELEMENT_SEATBELT elements are treated in PRIMER as shell elements of a special type. In the 'keyword' editor for shells there are mutually exclusive options to display:*

3/4 noded shells
6/8 noded shells
4 noded seatbelt shells

However the seatbelt shells were not filtered out when the 1st of these, '3/4 noded shells' was selected. This has now been corrected. (Note: the revised keyword editor in 9.3 makes this fix redundant)

- ***Case 10585***

If 3 or more models were in the database, and an intermediate one was deleted, then using the Up arrow key to toggle through the models would cause PRIMER to hang on some Linux systems, or crash on others. This has been fixed.

- ***Case 10570***

The delete element option accessible from Part>Edit>Contents>Remove/empty has been removed from the code. If the associated deletion operation failed to delete the elements (e.g. because of references), the elements were left as 'orphans' with no part id. This caused problems elsewhere. Elements should be deleted using the standard methods of deletion. Removal is still available but only in the case of move to another part.

- ***Case 10552***

*When using the generic keyword editor (KEYWORD option) to edit *CONTACT ENTITY cards the CHECK_ALL option would report that the radius of a Spherical contact entity was zero, when this was not the case. This has now been fixed.*

- ***Case 10547***

*PRIMER gave an error message when clicking on the 'LEN P' button when setting up a PRISM type *RIGIDWALL through the edit panel. This has been corrected.*

- ***Case 10457***

In 'Keyword editor' panels the UPDATE button would become greyed out if all items were deleted. Normally this would be correct, but in cases with different options or suffices the user might delete all items of option A, but still have some 'live' definitions of option B and - apparently - be unable to update and save changes. In fact switching back to option B would restore 'UPDATE', but this is not obvious. Therefore UPDATE has now been made unconditionally live in these panels, and if everything in a category has been deleted then it will be tantamount to CANCEL. (This is superseded by the revised keyword editor in release 9.3)

- ***Case 10428***

*The processing of the <IMSCL> field on *CONTROL_TIMESTEP in the control card editor was going wrong inside the logic that tried to distinguish between a +ve integer meaning a value, and a -ve integer meaning a *SET_PART. This has now been fixed.*

- ***Case 10318***

Creation of node _SCALAR and _SCALAR_VALUE using the node edit panel, contained a number of errors. These have now been resolved.

- ***Case 10307***

Various problems with editing beams elements:

- *When creating beams automatically from <n> nodes the tolerance used when picking nodes was too large. This wouldn't matter if the screen pick was close to the correct nodes, but if it was some distance away it could result in wrong nodes being used.*
- *Also if the 'filter' options for auto-creation were used, then turned off again, the filtering would not be reset meaning that only nodes on the selected items could be picked.*

Both problems have been fixed.

- ***Case 10281***

*Changing *ELEMENT_SHELL from option _BETA to _MCID using the edit panel could lose the MCID value when the panel is updated. This is now fixed.*

- ***Case 10203***

Invoking the keyword editor for solid elements could corrupt the solid element data. This has been fixed.

- ***Case 10081***

If a 'Keyword' editing panel for a keyword category is already open it was currently possible to open second and subsequent panels for the same keyword, which can cause internal (and user!) confusion if multiple conflicting edits are made to the same data.

Any attempt to do this is now trapped, and only a single 'Keyword' editing panel may be opened for a keyword. If a 2nd is attempted a warning message is issued and the original panel is brought to the front and de-iconised if necessary.

- ***Case 10039***

*Edit of *SET_SEGMENT could sometimes cause a crash (particularly on PC/Linux machines) could result. This has been fixed.*

- ***Case 10034***

**ELEMENT_SHELL_BETA could be corrupted if edited with the Keyword editor, and then the edit cancelled.*

- ***Case 10010***

Modification of solid elements in keyword editor caused _DOF option to be activated for all modified. This has been fixed.

- ***Case 10005***

Use of popup for scalar nodes on edit panel of ELEMENT_SOLID_DOF was crashing PRIMER. The code has been fixed.

- ***Case 9858***

The database cross section editor showed the wrong graphic in the GUI for the chosen section type (constant X, constant Y, etc). This has now been fixed.

- ***Case 9848***

For a few material types, notably #34 (FABRIC) the 'sub-editing' panel of the material editor, invoked by clicking on the header of a data field, could give spurious results and fail to work properly. The main editing panel works correctly. This was caused by internal confusion occurring when editing materials with very variable card layouts. This problem has now been fixed.

- ***Case 9814***

When one applied UPDATE in some non-keyword edit panels (e.g. ASSIGN_MASS) PRIMER could give a spurious error about inconsistent include layers. This is now fixed.

- ***Case 9809***

*Bug fix to editing panel for *CONSTRAINED_JOINT_..._LOCAL. For this type of joint, the RAID field was not displayed properly or could be edited when the field LST was 1. This has been corrected.*

- ***Case 9714***

The CREATE_TABLE daisy-chain popup menu option could disappear from these popups, leaving a blank space. This would only occur in contexts where a table would be a valid alternative to a loadcurve, and would be dependent upon the order of operations. The problem was due to the 'table' button being overwritten, and has now been fixed.

- ***Case 9709***

*The PLOT DYNA function (on *DEFINE_CURVE edit panel) which shows the discretized curve that LS-DYNA will use for load curves used by MAT_24, was not displaying the Dyna curve correctly when parameters SFA SFO OFFA OFFO were set for the curve. The parameters were in fact being wrongly applied when in raw data mode and applied twice when <INC SCALE+OFFSET> was used. This has been fixed.*

- ***Case 9708***

The check on autofix for tables of curves defined with irregular abscissa (x) values did not work correctly if SFA or OFFA was set on the curves. This is now fixed.

- ***Case 9674***

*Field 'MCOUP' on the *CONSTRAINED_LAGRANGE_IN_SOLID card was not operating correctly in keyword editor panels because it requires a negative label to represent a set, but if this picked from a list or the screen it was being returned as a positive value. This has now been corrected, and if a set is 'selected' it will now receive the correct negative label.*

Bugs fixed in release 9.3RC1

- ***Case 9409***

*The editing panel for *ELEMENT_SEATBELT_RETRACTOR had an entry for '#elements inside retractor', created automatically on panel exit, that was being reported wrongly when the panel was reopened for subsequent edits. This could lead to excessive numbers of seatbelt elements being created inside the retractor if the user reset it to what he believed was the correct value.*
This has now been corrected so that it reports correctly the current number of seatbelt elements within the retractor

- ***Case 9327***

View-edit panel for modifying segment set could crash PRIMER if the node popups (N1..N4)were accessed. An erroneous message about not being able to find a picked segment has also been corrected. The bug has been fixed.

- ***Case 9296***

Missing TEMP field for INITIAL_GAS_MIXTURE in keyword editor supplied.

- ***Case 9295***

*Labels in *DEFINE_VECTOR Window have been corrected to be XT, YT, ZT, XH, YH, ZH to match LS-DYNA manual.*

- ***Case 8766***

PRIMER92 failed to include provision for field A23 on Hybrid and Wang/Nefske airbags to refer to a Part if -ve. This has now been corrected.

- ***Case 8580***

For some time there has been a problem in PRIMER that some text entry fields can be too small for very wide data, and the problem has become worse as models have got larger and item labels have also grown.
Therefore where any text entry button has data overflowing its field a pair of bars are placed above the end-most character to provide a visual marker that the data shown is incomplete. This applies to either or both ends, depending on the extent of the overflow.
In addition such fields get an automatically generated 'hover text' popup box, so that if the user hovers the mouse over the field the popup box will show the full entry.

Find attached

Bugs fixed in release 9.3

- **Case 12180**

If FIND_ATTACHED was used with contact penetration checking by displaying a subset of the contact (a pair of parts), then it did not work properly because contact penetration plotting requires several special internal settings that conflict with FIND ATTACHED.

This has been resolved, and it is now possible to isolate a subset of the contact in the penetration checker and then use FIND_ATTACHED to identify what is close to it.

One limitation remains, which is that FIND_ATTACHED will not update the display in 'penetration' mode; rather if that is the current mode it will swap automatically back to shaded. This is necessary to sort out the internal conflicts that would otherwise occur.

- **Case 11183**

Find attached could, when used in recursive mode, get itself stuck in a loop using very large amounts of memory, ultimately causing a crash or a hang. The problem would be most likely to occur in large meshes of solid tetrahedra.

This has now been fixed: the memory consumption of the iterative (recursive) search has been reduced considerably, and the speed of the search has also been improved.

- **Case 10975**

Find attached function has been modified so that rigid body merges will be handled when the material definition of the (supposed) rigid part is latent or missing.

- **Case 10948**

The find attached function did not find shell attached to the nodes of spring elements using tied contact. This has now been fixed.

- **Case 10063**

Find attached could find attached items, even if the option to find through those types of entities was turned off on the find attached panel. Corrected now.

Bugs fixed in release 9.3 RC2

- ***Case 10099***

Find attached was not responding properly to beam 3rd node setting. This is now fixed.

Graphics

Enhancements made in release 9.3

- **Case 12048**

The dragging of cut sections using the mouse used the vector dot product of section axis in screen space with mouse motion in order to give an 'intuitively correct' movement of the cut plane.

However if the axis of the plane in screen space pointed directly in or out of the display then this dot product was zero, meaning that the section did not move. Therefore the algorithm has been modified so that if the section axis to be dragged is very close to pointing directly in or out of the display then, instead of projecting mouse motion onto it, a simple rule is used that +ve X or Y mouse motion equates to +ve section motion.

More simply: in this situation moving the mouse to the right or upwards will move the section in the +ve direction down its drag axis.

- **Case 11483**

It is now possible to view *INITIAL_FOAM_REFERENCE_GEOMETRY (the nodal coordinates can be swapped with “true” nodal coordinates in the same as *AIRBAG_REFERENCE_GEOMETRY).

- **Case 11206**

Version 9.3RC3 of PRIMER, 9.3RC2 D3PLOT & 9.3RC3 of T/HIS now support the use of a mouse scroll wheel.

If the scroll wheel is used within a graphics windown then it will zoom in/out about the current cursor position unless CN “Centre node” has been set, in which case zooming will remain about the coordinates of the selected node.

If the scroll wheel is used in a menu with a vertical scroll bar then the wheel will now scroll the window.

- **Case 11052**

The default JPEG image quality has been improved from (notional) 75% to 90%, which gives much better images at the expense of a moderate increase in file size.

A 'quality' slider with the range 10 - 100% has been added to the Images panel to give user control.

- **Case 10655**

Preference 'spotweld_size' has been added to alter the default size spotweld beams are drawn at.

- **Case 10009**

Historically PRIMER has detected when the length of a beam symbol on the display becomes 'short', and changes from drawing a simple line from N1 to N2 to a 'blob' symbol in order to stop the beam symbol degenerating to a nearly invisible dot.

This 'blob' symbol was based on the current spotweld symbol size, and because the 'short' dimension was fixed at 50 screen units it could result in models with short (but not zero length) beams developing a distracting splatter of 'blobs' as one zoomed out.

Conventional beam display has now been dissociated from spotwelds, and a user-controllable 'short' dimension and corresponding 'blob' size have been added to the Display Options panel.

The default dimensions have also been reduced so that the length at which a beam line symbol changes to a blob is much shorter which, combined with control over the blob size, gives better images in these situations.

- **Case 9883**

The logic of the '+' and '-' short-cut keys which zoom in and out respectively has been changed slightly.

Previously they always zoomed about the image centre, where now if the mouse is in the graphics window, they will zoom about the mouse location. (If the mouse is in some other window then the previous 'zoom about centre' logic is used.)

The 'centre of zoom' position does not move on the screen, so in effect the image is scaled about that point in its current location.

- **Case 9784**

Version 9.3RC3 of PRIMER, 9.3RC2 D3PLOT & 9.3RC3 of T/HIS now support the use of a mouse scroll wheel.

If the scroll wheel is used within a graphics windown then it will zoom in/out of the model. If the scroll wheel is used in a menu with a vertical scroll bar then the wheel will now scroll the window.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10187***

*In PRIMER 9.3 RC1, colours were not saved between PRIMER sessions. This has been addressed in part by writing a comment with each *PART definition that shows its colour and display mode. Therefore colours defined by the user by PART will be saved in the keyout file, and reloaded when the file is reread. This is not a full solution: ideally a 'properties' file, common with D3PLOT, needs to be written. This has been logged as an enhancement request.*

- ***Case 9934***

*When a *SET was edited the fact that its contents had changed was not being reflected in the graphics. For example changing the nodes in a *SET_NODE used by a *Constrained Nodal Rigid Body failed to update the graphics of the Nodal RB to reflect the new set. This has now been corrected: whenever a *SET (of any type) is edited the graphics of anything that uses it will be recreated.*

- ***Case 9820***

The ability to alter the line thickness for graphics in PRIMER has been added. This will affect all lines in the graphics window.

- ***Case 9612***

Solid spotwelds can now be coloured by number of panels (in the same way that spotweld beams can).

- ***Case 6822***

In PRIMER 9.3 RC2 GIF and PNG image output is now available

Bugs fixed in release 9.3

- **Case 12260**

Sketch of box contents function could cause PRIMER to crash on 64 bit platforms. This is now fixed.

- **Case 12143**

The MATCH IMAGE function had a few ergonomic problems:

- It did not make clear which model was being picked from, and if the user did a RESTART it did not reset this, so that subsequently it was only ever possible to pick nodes from the model that was first used.

- Only 4 node/point pairs are required for image matching, but the panel's response to picking lagged behind, so that it was necessary to start picking a 5th point before it would concede that 4 had in fact been picked and so allow you to perform a match.

- If you picked a 2nd or subsequent node from a model different to that of node #1 it complained, but instead of treating the next pick as a second attempt to pick a node it created a point instead, leaving the node undefined. This could cause problems.

These, and a few other minor issues, have been fixed.

- **Case 11997**

When labels were turned on in Vector plots of initial velocity they were always drawn in white, regardless of the colour of the graphics background, making them disappear if this also was white.

This has been corrected, and initial velocity labels are now drawn in the standard 'not background' colour.

- **Case 11845**

On platforms using PBuffers for refreshing the graphics window (typically Linux) the graphics of shell-based items 'sketched' on top of the current image could occasionally omit approximately half the elements.

The bug was noticed following a sketch of a layer from the connections panel, but it could probably crop up in any context where shells are sketched on a model in which the highest numbered part contains solids or thick shells.

This was because of the graphics driver getting stuck in 'back face culling' mode used to draw 3D elements, so that shells sketched subsequently would only be drawn if they faced the user. (Rotating the view would reveal different faces.). This has now been fixed.

- **Case 11805**

If connection visibility was turned on in the Entity panel then connections were drawn correctly, however an Autoscale operation failed to take them into account when re-computing the graphics scale. This has now been fixed.

- **Case 11782**

When Model, Copy is used inside PRIMER any part colours in the source model are lost, as the target model reverts to the standard PRIMER colour scheme.

This is inconsistent with the behaviour when a model file is written out and read in again, which preserves colour and transparency information.

Model Copy has therefore been modified so that non-standard part colour and transparency data are copied to the target model.

- **Case 11756**

When drawing a *BOUNDARY_PRESCRIBED_MOTION_RIGID_LOCAL definition PRIMER still showed motion in/about a global direction if the rigid material of the part had a local coordinate system defined.

This has been corrected: if motion uses <dof> values 1-3 (translation) or 6-8 (rotation), and the RIGID_LOCAL sub-keywords are used, and a PART referred to, then the relevant axis will take into

account any rotations implied by the LCO system (or the A and V vectors) on the *MAT_RIGID card of the part's material.

- **Case 11702**

Fixed a bug whereby colours changed in 'Element Properties' type contour plots when the contoured model was zoomed dynamically.

- **Case 11572**

Previously the size of the graphics symbols used to draw (1D) seatbelt elements and their related retractors, sliprings, accelerometers, etc was based on a fixed proportion of the overall model dimension.
This worked reasonably well when the bounding box round the model was not wildly different in size to that around just the belt and dummy; but in cases where this was not the case - most notably where beam '3rd' (orientation) nodes were a very long way away - it could give outrageously large symbols.

Therefore these symbol sizes have been revised so that they have a characteristic dimension of 50 'model units'. This is implicitly mm, but if the model bounding box is less than 100 'units' then metres are assumed and this value is divided by 1000.

The value is user-configurable in the Display > Options panel, where it may be set to any (reasonable) alternative value.

- **Case 11556**

When CONNECTION labels were switched off in the ENTITY panel sometimes the labels would nevertheless remain. The actual likelihood of this happening would be unpredictable. This has now been fixed.

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When Model, Copy is used inside PRIMER any part colours in the source model are lost, as the target model reverts to the standard PRIMER colour scheme.

This is inconsistent with the behaviour when a model file is written out and read in again, which preserves colour and transparency information.

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This has been corrected: if motion uses <dof> values 1-3 (translation) or 6-8 (rotation), and the RIGID_LOCAL sub-keywords are used, and a PART referred to, then the relevant axis will take into account any rotations implied by the LCO system (or the A and V vectors) on the *MAT_RIGID card of the part's material.

- **Case 11702**

Fixed a bug whereby colours changed in 'Element Properties' type contour plots when the contoured model was zoomed dynamically.

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This worked reasonably well when the bounding box round the model was not wildly different in size to that around just the belt and dummy; but in cases where this was not the case - most notably where beam '3rd' (orientation) nodes were a very long way away - it could give outrageously large symbols.

Therefore these symbol sizes have been revised so that they have a characteristic dimension of 50 'model units'. This is implicitly mm, but if the model bounding box is less than 100 'units' then metres are assumed and this value is divided by 1000.

The value is user-configurable in the Display > Options panel, where it may be set to any (reasonable) alternative value.

- **Case 11556**

When CONNECTION labels were switched off in the ENTITY panel sometimes the labels would nevertheless remain. The actual likelihood of this happening would be unpredictable. This has now been fixed.

- **Case 11546**

The 'attached' and 'unattached' node display logic was originally programmed so that 'attachment' was conferred only by membership of the topology list for an element (excluding beam 3rd nodes).

This generated some controversy, since some users believed that being an extra node on a rigid part, or in a nodal rigid body, should also confer 'attachment'; but there seemed to be no consensus about this.

Therefore, in order to try to please all the people all the time, an 'options' panel has been added to Node Attached/Unattached in the Entities panel, which allows the user to select which *Constrained items confer attachment to nodes for the purposes of graphics.

- **Case 11348**

Nodes used solely as beam '3rd' (orientation) nodes are not treated as 'attached' for the purposes of display, which is correct.

However these nodes also did not appear when 'unattached' display or labelling was turned on, meaning that the only way to display them was to use 'All nodes'; which was incorrect.

This has now been fixed: nodes whose only connection with elements is as '3rd nodes' are now displayed and/or labelled as 'unattached nodes' when the display of these is turned on.

- **Case 11347**

PRIMER would give a graphical error message if selecting a keyword or tool that is already open, but the tab is not visible in the PRIMER tab area due to more than 8 panels being open. This has been corrected.

- **Case 11303**

When 'Lock' (on the viewing panel) was used to lock blanking following an 'attached' operation the results of a subsequent Unblank or Reverse blanking operation were incorrect.

This was an intrinsic failure of the 'lock' function to store the current blanking status correctly, and it could have gone wrong at any time - although this would be most likely to happen following an 'attached' operation.

This has now been fixed, and 'locked' blanking should behave correctly regardless of the operations carried out beforehand.

- **Case 11302**

The graphical display of joints could fail, giving a warning message, if some of the optional sub-keywords (e.g. _FAILURE) were used. This was due to an internal error, and has been fixed.

- **Case 11243**

If only Nodal Rigid Bodies were displayed (i.e. no other nodes or elements) then Autoscale would fail to recompute the current view correctly.

In fact this problem could exist for any item type that was drawn solely in terms of set contents.

This has been fixed, and autoscale is now working correctly for these more abstruse items

- **Case 11182**

Label colour of elements sketched via the 'Entities' panel is now correctly set to 'Not Background' instead of 'White'.

- **Case 11048**

If the sequence:

1. Change the colour of a part.
2. Edit the part and move its elements to a different part.

Was used the colour of the moved elements remained those of their original part, and did not acquire the colour of their new one.

This was because setting an explicit colour 'by part' propagated this explicit colour down to the elements of the part, effectively fixing it.

This behaviour has been changed so that setting explicit colours 'by part' now sets the part to that colour, but propagates to the part's elements as 'use parent part's colour' (the default behaviour).

The resulting colour change appears the same, but if the elements are subsequently re-parented to a different part then they will draw in the new part's colour because of this 'use parent' logic.

Note that setting an explicit colour by element, as opposed to by part, will effectively 'fix' the colour of the element so that it does not inherit its parent part's colour. This distinction is both deliberate and correct.

- **Case 11007**

The display of *BOUNDARY_PRESCRIBED_MOTION was a bit misleading for the 'rotation about a remote axis' options (DOF = 10/11/12).

This has been improved so that the arrows now show the appropriate motion vector at each affected node.

- **Case 10991**

When input is restricted to a single window the 'banned' cursor [X]becomes current in the drawable part of all other windows. However window management and also dynamic viewing commands are still possible.

Following dynamic viewing (shift/ctrl + mouse button) in a graphics window the cursor was not returning to the 'banned' cursor, giving the false impression that input was now permitted in the graphics window. This has now been corrected.

- **Case 10918**

The following graphics problems have been fixed:

1. If <ctrl> wireframe dynamic viewing was used with the right mouse button, implying a scale change, then the plotting mode (correctly) reverted to full wireframe drawing in order to calculate the changes in image size for scale-sensitive items.

2. However when the intrinsic display mode was shaded with free edge overlay then the default fully-edged wireframe mode looked strange.
   This has been corrected, and if the intrinsic plotting mode uses free edges then the <ctrl> dynamic viewing mode will now do so also.

3. Following from the above if <ctrl> + <right mouse> dynamic viewing was swapped to 'free edge only' by also depressing the <shift> button then, depending on the order in which keys and mouse buttons were released, the display could get 'stuck' in wireframe display mode.

   This has now been fixed: graphics will now always revert to the correct display mode regardless of the keyboard or mouse button release sequence.

4. If <ctrl> dynamic view (with any mouse button) was used, and node display was turned on in the entity panel, then the display would not revert to its intrinsic mode. This has now been fixed.

5. In <shift> + <ctrl> free edge display mode any elements which did not use default or fixed (as opposed to palette chosen) colours would be drawn in black.

   This has now been fixed, and free edge display will now use the correct element colours, whatever they may be.

- **Case 10890**

When elements were moved between parts (Part add/remove contents) they would sometimes not acquire the colour of their new 'owner' part.

- **Case 10875**

Blanking by *SET_xxx_ADD, and also *SET_NODE_ADD_ADVANCED, would either appear to do nothing or blank the wrong items if default (non-recursive) blanking was used.

This was because the special logic used for non-recursive blanking, designed to stop too many things (particularly nodes) being blanked, was too restrictive in this case and was not propagating selection by SET_xxx_ADD down through its contents to the ultimate definition.

This has now been fixed: if explicit display of sets is turned off, the default, then blanking by these compound set types will now blank the ultimate set contents (i.e. those things you would see if you SKETCHed the set contents).

- **Case 10862**

When the ELEMENT, SHELL, NORMALS command was used to make shell element normals consistent the graphics of free edges was not updated correctly, resulting in free edges on elements with modified topology appearing in the wrong places.

- **Case 10861**

On platforms using an OpenGL Pixmap or Pbuffer to handle screen refreshes (which in practice means Unix or Linux machines using 24 bit-plane default visuals, and not Windows machines) the display of outward normal plots could go wrong.

They would be shown correctly when initially drawn, but if anything caused a screen refresh from the backing store image then they would come out wrongly. A formal redraw, or any dynamic viewing command, would correct the image again.

This was because the special colouring mode required for these plots was not being set up correctly when creating the off-screen backing store pixmap/pbuffer image.

- **Case 10851**

Display of 'thick' cut sections was going wrong on machines where graphics window refreshes were served by off-screen pixmap/bitmap (which generally means Windows, and Linux/Unix displays running at 32 bit Truecolor depth).

The symptoms were that anything which caused a graphics window refresh, for example moving an overlying menu panel, resulted in the 'thick' cut section showing only its outer planes and not drawing the normal bit in the middle.

- **Case 10830**

The display of contacts when displayed explicitly (via their entity switch) or when using 'only' in the part tree has historically been very slow.

This is because the contact segments are hatched with broken lines in order to distinguish them from 'ordinary' elements, which would otherwise look the same.

To speed matters up the display of contacts in shaded mode has been changed so that instead of 'solid hatched' they now use a 'stippling' technique, which draws them through a mask that results in a slightly textured and transparent appearance.

This is as fast as ordinary (unhatched) display, but still gives a visual distinction between contact segments and conventional elements.

The details of this display mode can be altered in the Display > Options panel, and the default may be set via an 'oa_pref' file option.

(Wireframe, hidden and contact checking display modes are unchanged. The former two are still hatched and hence slow, but 'unfilled' graphics leave no alternative method of distinguishing segments from elements.)

- **Case 10737**

When extra nodes on rigid bodies were sketched only the nodes and a vector to the body centre were shown, not the body itself.

This has now been changed: during normal graphics (i.e. the entity switch for nodal rigid bodies turned on) then display remains the same to avoid clutter; during sketching the parent rigid body is now shown.

It can also be shown in 'normal' graphics by turning on Part display under 'Associated data' in the Entity panel.

- **Case 10732**

Previously the size of graphics used for 1D seatbelt elements (and related retractors, sliprings, sensors and accelerometers) was based on 1% of the model overall diagonal.

Although this gave a reasonable 50mm value for a typical 5m car, it resulted in stupid values for models containing other structure and was not controllable.

Therefore the graphics size of these symbols has been changed to a notional 50 model space units, implicitly mm, with the proviso that if the model diagonal is less than 100 units long then metres are assumed and the value is divided by 1000.

In addition the size of these symbols is now controllable in the Display Options panel.

- **Case 10717**

If there is only one model in the database and its drawing is turned off in MODEL, LIST, then any selection menus (for Blank, Orient, etc) will be empty, with no way of turning things back on again and showing items.

This is because the model visibility acts as an initial filter on model component display in these menus, which is correct if there are 2 or more models - and hence model 'tabs' are shown - but a nonsense if there is only one.

This has been fixed by adding a special test for 'only one model' when initialising selection menus, and making that model display unconditionally if this is the case.

- **Case 10643**

If the user chose 'ZM' (or used the 'Z' short-cut key), but started their zoom operation by pressing the mouse button in a window that was not the graphics window, then zooming went haywire (on Windows platforms only).

This has now been fixed: zooms which start outside the graphics window are now ignored, making the behaviour on Windows consistent with that on Unix/Linux.

- **Case 10642**

PRIMER will no longer permit users to sketch nodes during node creation when any of the 'between' functions are used. Nodes can be sketched once creation is complete.

- **Case 10615**

On platforms where overlay planes are not available to service graphics refreshes (typically Linux and Windows) replacing a connection from the Connection table could result in a blank graphics screen if an overlying window was moved, provoking a screen refresh request.

This could be solved by redrawing the image explicitly (LI, SH etc commands) or by performing a small dynamic view movement. Turning off graphics refresh from backing store would also solve the problem.

This has now been fixed, and in passing graphics refreshes from backing store have also been speeded up on platforms without overlay planes.

- **Case 9665**

In PRIMER and D3PLOT 9.3 the cursor used for dynamic rotation about the screen Z axis has been modified so that it is clearer when displayed against a white background.

- **Case 5407**

A criticism levelled at PRIMER is that 'sketched' items sometimes persist on the display, and get in the way of ordinary graphics.

The programme tries to determine when transient graphics are no longer required, but it cannot always know the mind of the user!

Therefore a new 'Clear sketched' option has been added to the 'Tidy' popup menu in the view box, which deletes sketched and (most) other transient graphics from the display. The <delete> key will also do this as a 'short cut' key.

Bugs fixed in release 9.3 RC2+

- ***Case 10879***

The display of database history node with the _LOCAL option was not working, either for scalar nodes or for the _SET variant. This has now been fixed.

Bugs fixed in release 9.3 RC2

- ***Case 10560***

Labels of entities displayed on the screen sometimes did not appear to renumber following a PRIMER renumbering operation. This has been fixed and labels should now update automatically.

- ***Case 10543***

The IMAGES menu operation to write image files, in any format, did not work when running under X11 graphics. This has now been corrected. However the limitation that background and watermark images cannot be displayed under X11 graphics remains.

- ***Case 10528***

*When creating *CONSTRAINED_NODAL_RIGID_BODY definitions the pick symbols used when in 'nearest <n> nodes' mode were not behaving consistently. This has been fixed.*

- ***Case 10388***

*If graphics is switched to 2D mode then *DATABASE_CROSS_SECTION definitions are not drawn. (They display correctly in 3D mode). This was due to an erroneous internal test for their visibility when in 2D mode, and has been fixed.*

- ***Case 10143***

The display of 'triads' showing element cosines was wrong for 3D Solid and Thick Shell elements drawn in hidden surface (ie HIdden or SHaded) display modes.

Only the first visible face on the element received a triad, and the axes shown were that of the face (as if were a 2D element) rather than of the element of a whole. These have been corrected so that

in hidden surface modes triads are drawn on all visible faces, and the axes shown are now consistently those of the element.

- ***Case 10112***

When a model is quite small in absolute numeric terms it is possible for zooming the view in to a spotweld suddenly to turn the whole screen one solid colour. This has now been fixed.

- ***Case 10071***

In isolated situations items sketched on top of an image might not appear until the graphics was subjected to some sort of dynamic viewing event. A related, but separate, problem was that these graphics might be deleted if a panel was moved in front of the graphics window, or the graphics window was resized. This problem might also appear as the items flickering briefly into view and then disappearing again. Both problems have been fixed.

- ***Case 10055***

AIRBAG_INTERACTION cards were sketched wrongly from the master 'sketch' option under the AIRBAG tool (showing all airbags), and the option to sketch them in the keyword editor was not working. These problems have been fixed, and in addition the 'AIRBAG' option on the ENTity visibility panel has been improved to include the separate categories 'Airbag' and 'Airbag_Interaction', making their display and labelling individually switchable.

- ***Case 10054***

PRIMER could crash if the user pressed 'REFRESH DISPLAY' in the clipboard when there was no model present. This has now been fixed.

- ***Case 10042***

When using 'Images, Copy to Clipboard' on Windows platforms the popup menu giving this option was not unmapped before the image was captured, leading to it appearing in the clipboard snapshot. This has now been fixed, and it no longer appears in the clipboard image.

- ***Case 9933***

On Linux machines using 'PBuffers' for image refresh (the default behaviour) problems could arise if anything in the image was made transparent. Backing store update could become extremely slow, with the image 'crawling' up the display over several seconds; and blanking would appear not to work properly because the Z depth at which things were drawn would be wrong.

Both problems were related, and due to the special transparency settings being left active in the graphics driver when they should have been turned off. This has now been fixed.

- ***Case 8655***

In top level keyword menus (eg NODE) a 'COPY' operation would autoscale the image upon completion. This has now been changed so that following the COPY the image is still redrawn, to show the new items, but the current scale is not changed.

Bugs fixed in release 9.3RC1

- ***Case 9559***

Labelling and sketching from 'daisy chain' popup menus was hard-wired to draw in white, making such items invisible if the background colour was also white.
In addition such labels were rendered taking into account hidden surface removal, making them invisible if they were obscured by overlying structure. Both have now been fixed: labels are drawn using 'not background' colour; and are always drawn in wireframe mode, ignoring any hidden surface removal.

- ***Case 9372***

Some batch commands, notably 'ORIENT' but others as well, attempt to draw things on the screen. When PRIMER ran in non-graphical mode (-d=batch on the command line) these could cause problems, including a crash, due to attempts to perform graphical operations without these being set up correctly.

This has been corrected: graphics commands issued either directly or indirectly from the command-line are now ignored when in batch mode. This means that it is not necessary to have a graphics window open when running PRIMER in batch.

- ***Case 8934***

Two problems arose when OpenGL 'Pbuffers' were used for graphics refresh on Linux platforms:

1. *In a few cases subsequent Hidden or Line mode plots could come out in thick linestyle when they shouldn't.*
2. *Graphics refresh after an area was exposed could either be very slow, or not happen at all, or have some regions missing.*

Both problems are believed to have been cured, but if users still experience graphics problems on Linux it is recommended that they swap to 'Pixmap' graphics refresh mode. (Options, Refresh >, Backing Store >, Pix/Bitmap).
There is circumstantial evidence to suggest that the problem is limited to NVidia cards prior to the FX3400. If you have such a card using 'Pixmap' refresh seems to work.

Groups

Bugs fixed in release 9.3

- **Case 10706**

Some complex group definitions could result in the contents not being properly decomposed within PRIMER. This has been corrected by applying a logical hierarchy to the decomposition.

Include files

Enhancements made in release 9.3

- **Case 12295**

The include file mass function was over-estimating the mass of includes when lumped masses were present on nodes which share multiple parts, because the lumped mass was wrongly being counted multiply. This is now fixed.

- **Case 11912**

PRIMER is now able to check for modifications to include file of models that have been built in PRIMER. This feature is available off the include tree for models built from database. It is also used to detect any changes before user submits a .csv file for multiple loadcase build, so that he can ensure that on disk files are in sync with any changes to the model in memory.

- **Case 11674**

A new option called 'include_files_method' has been added to the Preferences panel. This enables the user to either write out all include files into a subdirectory or instruct PRIMER to prompt the user to choose the include files to write out.

- **Case 11606**

A summary of include file masses broken down by part mass, lumped mass, assign mass, etc. has been added to the end of the summary file generated under the utilities function.

- **Case 11390**

A new option called 'include_file_paths' has been added to the Preferences panel. This enables the user to write out absolute or relative pathnames for include files in INCLUDE statements.

- **Case 11215**

The delete include file option available from the include tree or the part tree has been improved.

1. Users are offered control over how items for deletion are selected. This may be by strict selection of what is in the include or by flagging the contents and propagating the selection.
2. On applying deletion PRIMER will check to see if any other include files will be changed as a result. If so the user will have option to abort deletion, leaving model unchanged.
3. On completion of successful deletion of its contents, the user will be offered the option of removing the include file from the model.

- **Case 7601**

Include file numbering ranges can now be viewed and edited in a table-style menu (accessed from Model=>Renumber=>Renumber Includes, or from the Include menu, right-click on model, Renumber Includes). The numbering ranges can be set to the range covered by its existing entities (Auto button). Clashes between numbering ranges of different include files are identified and highlighted.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 8996***

*PRIMER 9.3 RC2 can handle *INCLUDE within an *INCLUDE_TRANSFORM. Also, *INCLUDE_TRANSFORM within *INCLUDE_TRANSFORM, but note that (as in LS-DYNA 971 7600) the transformations are not cumulative, only the last one is applied.*

- ***Case 8189***

In PRIMER 9.3 RC2, each model can have its own 'Current Layer' (INCL file into which newly created entities are put). This should reduce the instances of 'Bad Layer' messages and reduce the need to change the current layer when switching between models.

- ***Case 8122***

An autofix added to renumber include file contents into a specified numbering range. Additionally when the range values are set in the panel accessed from the include tree, the option of renumbering (should it be required) is offered.

Bugs fixed in release 9.3

- **Case 11893**

PRIMER was not writing relative path for INCLUDE_STAMPED_PART when this was the option set. This has been fixed.

- **Case 11724**

When reading an include containing connection data by the ADD NEW CHILD function, PRIMER would lose information about connection layers which did not exist in the include file. This has been fixed.

- **Case 11479**

*INCLUDE_TRANSFORM did not work properly with *DATABASE_CROSS_SECTION. After some testing, cross sections are now offset by idpoff.

- **Case 11244**

When reading in a model using INCLUDE_TRANSFORM's containing *MAT_WINFRITH_CONCRETE_REINFORCEMENT cards, PRIMER could refuse to read in some INCLUDE_TRANSFORMS due to material label clashes. Fixed now.

- **Case 11030**

The Include Tree provides users with an option to decrease the depth of an include file. Other files which were originally at the same depth and were below the selected file would then temporarily appear as children of the selected file. This has been fixed.

- **Case 10954**

If an include file used any PRIMER entities stored after *END (e.g. origami, seatbelt, mechanism, group etc) and the file was included more than once by *INCLUDE_TRANSFORM the offsets for the entities were not calculated correctly and PRIMER could have prevented the file from being read. This has now been fixed.

- **Case 9574**

If include files were dragged to be children of other include files in the part tree, the include tool could sometimes fail to build the tree. This has now been fixed.

Additionally in the part tree, if an include had child includes and you did blank, unblank or only in thepart tree its children were not taken into account. Now they are.

- **Case 8765**

PRIMER would have problems if the user had an airbag_reference_geometry in an include file on its own included with *INCLUDE_TRANSFORM. e.g.

```
*INCLUDE_TRANSFORM
airbag_without_ref_geom_but_with_origami.key
*INCLUDE_TRANSFORM
airbag_ref_geom.key
```

This has now been fixed.

Bugs fixed in release 9.3 RC2

- ***Case 10512***

*When a model with include files has *PART definitions in one file, but *ELEMENT cards referencing that part in different includes, then blanking and unblanking 'by Include file' would possibly fail to give the correct blanking status to the elements. The problem has been fixed.*

- ***Case 10498***

If an include file contained a part definition but not the elements for that part, then blanking the include would not remove the part from the screen. However, unblanking the include would unblank the part. This has now been fixed and blanking and unblanking are now consistent.

- ***Case 9907***

**INCLUDE with a relative filename and windows directory separators (e.g. *INCLUDE INCL\fred.key) would not work if read on a Unix machine. This has now been fixed.*

- ***Case 9751***

Include file for connection FE items has been fixed. When creating off panel, or by read of xml, items will be created in current include. When remaking off table items will remain in same include (taken as include of first item). The connection table also has new options to modify the include of connection FE items. Labels of newly created FE items for connections have been corrected to observe the label ranges set for the include files if these exist. The connection table now has several options for controlling the numbering of FE data created when a connection is remade.

- ***Case 9639***

*Doing 'add new child'->'*INCLUDE_TRANSFORM' from the include tree would give an error if the include file contained any comments. Additionally the comments and thumbnail (if present in the file) would be lost. This has now been fixed. The graphics are also refreshed when an include file is inserted.*

- ***Case 9016***

*It is now possible to create an empty *INLCUDE_TRANSFORM from the include tree. Previously PRIMER would not allow you to do this because the file did not exist.*

Bugs fixed in release 9.3 RC1

- ***Case 9517***

Creation of INCLUDE_TRANSFORM with label offsets caused selection from object menu to fail because of a missing call to resort PRIMER's internal list of labels. Note: this did not affect read in or write out of models with INCLUDE_TRANSFORM.

Measure

Enhancements made in release 9.3RC1

- **Case 9565**

In cases such as MEASURE, where cross-model picking without a controlling menu panel is performed, problems arose when MODEL LIST was used to swap model visibility while picking was active. Effectively picking was restricted to the model that was active when the operation started, and models subsequently made visible were not pickable because they were 'latched' off internally. This has been corrected, and picking across models is now possible when their visibility status changes while the picking operation is still active.

Bugs fixed in release 9.3

- **Case 12105**

In the MEASURE function the pick symbols on all nodes picked remained visible on the screen, whereas each set of point symbols disappeared when the next set was picked.

This has now been fixed: the previous node pick symbols will disappear when the first of the next set is picked.

Menus (User interface)

Enhancements made in release 9.3

- **Case 11526**

Some users have found that the difference between the left hand <shift> and <ctrl> keys (which drive dynamic viewing) and the right hand ones (which drive 3D Z clipping and lift options) is unhelpful, especially when two people are using a machine and find it difficult to reach parts of the keyboard.

Therefore the following changes have been made:

1. By default the left and right meta (shift & control) keys are now symmetrical: both drive dynamic viewing, and it doesn't matter whether right or left keys are used

2. To preserve the capability to perform Z clipping the 'old style' behaviour is restored when, and only when, the 'Viewing, 3D Options' panel is live. Once this panel is dismissed symmetrical behaviour is restored.

This change affects both PRIMER and D3PLOT in the way described above.

T/HIS never used the right hand meta keys, which did nothing, but it too now shows symmetrical behaviour with both left and right keys driving dynamic viewing.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10418***

A 'placement' option has been added to the command line arguments which allows the initial PRIMER window to be located on a particular monitor of a dual-screen display running in 'single logical screen' mode. By defining '-placement=left' (or '=right'), usually in conjunction with the existing '-maximise' command, the initial PRIMER window can be forced to appear on a particular display, stopping it spanning the two monitors. These options can also be added to the oa_pref file using the same syntax.

- ***Case 10163***

Tabs for open windows are now not limited to 8. If more than 8 windows are open, the user can now scroll through the tabs.

Bugs fixed in release 9.3

- **Case 11781**

On some X11 platforms (Unix/Linux), some of the time, a window would be created either with no contents or - rarely - with the top bar contents in the wrong place.

This was not predictable, and only seems to affect certain rogue machines, so although it has been 'fixed' we are not entirely sure why the fix (which is to force some extra synchronisation) should work.

- **Case 11587**

On some Unix/Linux platforms it would sometimes be the case that 'listing' boxes would be empty when first mapped. Any sort of window management event would then populate them. This has now been fixed.

- **Case 11586**

On most Unix and Linux systems the file selector box would fail to respond to a 'window close' request ([X] button on Linux), although Cancel would work correctly.

On older (2.4 kernel) Linux platforms only the effect was worse in that such a 'close' would delete the file selector box, but not return control to the main PRIMER window, resulting in a 'freeze' of the whole application which would have to be killed and restarted.

These problems were related, and have now both been fixed: on all Linux and Unix platforms the file selector box now closes properly, and control also reverts correctly to the main programme.

- **Case 11500**

On platforms that use X11 window managers (i.e. Linux and Unix) it could sometimes be the case that 'listing' boxes containing text, such as 'help' and 'explanation' messages, would appear partially or fully blank in PRIMER. Performing any sort of window manager operation on the box would then result in its contents appearing. This has now been fixed.

- **Case 11407**

This is logged against PRIMER, but since it is a menu system problem it can affect all programmes.

When input is restricted to a window then it is banned in all other windows, and this can cause problems if the 'permitted' window somehow gets behind others and is invisible, giving the impression that the menu interface has locked up.

To solve this problem the menu system has now been modified so that when input is restricted in this way then the 'permitted' windows are always 'on top' of the others, meaning that they can't get lost.

Bugs fixed in release 9.3 RC2

- ***Case 10573***

On program start-up with checkpoint files present if the user chose to delete a file that was protected against him a crash could occur. In addition if an empty checkpoint file (from a previous session that was aborted immediately) was found then the warning message would state 'couldn't read data from ...' which made this sound like an error. The length of the file is now checked, and if it is empty then the warning message says 'empty file ignored', which is more helpful and accurate.

- ***Case 10504***

Hitting the <escape> key repeatedly very fast in the main window area, underneath the 'tabbed' buttons, to dismiss many panels quickly could sometimes generate error messages about attempts to remove tabs that no longer existed. This was caused by the <escape> events being delivered to the graphical user interface faster than it could process the un-mapping of windows. This is in fact harmless, so the message has been suppressed.

- ***Case 10503***

In cases where input is 'locked' to a particular window, requiring the user to click (typically) 'OK' to continue, then input in all other windows should be banned, showing the 'X' cursor symbol. However the 'X' button, which dismissed the window, and its <escape> short-cut key were both still being processed in banned windows. This could lead to PRIMER seeming to lock up. This is no longer permitted: only harmless window management operations such as resize, move, iconise and maximise are now permitted in 'banned' window.

- ***Case 10438***

In a few situations popup windows would be mapped at an unnecessarily small size, resulting in scroll bars being added. This was more of a nuisance than an error, but it still merited correction. The error has been traced to a tolerance problem when computing the required size for new windows, and has been fixed.

- ***Case 10419***

Checkpoint file playback on devices with X11 window managers (ie Linux, Unix and X emulators on Windows) suffered from the problem that the top-level Window size did not always match the original, making recorded screen-picking operations unreliable.

In addition the placement of the top-level window on the monitor had a tendency to be arbitrary. This became a problem on systems configured with dual monitors as a 'single logical screen' where windows spanning monitors are often unpleasant to deal with.

Both problems have been fixed: checkpoint file playback on these window managers should now reproduce window size and placement correctly and therefore recorded screen picks should now also resolve correctly. This problem was fixed on Windows platforms in PRIMER 9.3 RC1, but the fix has now been extended to X11-based platforms.

- ***Case 10246***

Previously hover text attached to a button in a master panel could be invoked 'through' a child panel, even if the child obscured the master button. Such propagation has now been halted, and this problem will no longer occur.

- ***Case 10037***

This is logged against PRIMER, but would affect all programs in the same way. On playback a checkpoint file includes window resize operations, but these did not work correctly for the master window of the process because the stored coordinates were those inside the decoration border applied by the Window Manager, but when the window was resized during playback the whole window was made that size, resulting in it being too small. This has now been corrected: on playback the window size is corrected to remove the offsets created by the borders, resulting in the original size being restored.

- ***Case 9730***

The logic used for writing text in 'radio' buttons was very conservative in its assessment of the vertical space allocated, with the result that if the overall menu system display factor was increased beyond roughly 1.25 the text in these buttons could disappear in a some contexts where space was tight. One such example was the mode button set in the occupant limb positioning menu.

The logic of text positioning in radio buttons (generally) has been improved so that it still gets written at much finer overall scale factors. The end result can look a little bit squashed at high factors, but is still readable and infinitely better than the previous situation of having no text at all.

Merge

Enhancements made in release 9.3

- **Case 6930**

Sometimes when incrementing model labels whilst carrying out a MODEL-MERGE the resultant model could be left with unnecessarily large gaps in the labels of items between the existing labels and the ones renumbered. This would occur in models with high label values. Modified the logic to remove this large increment.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 9719***

It is now possible in model merge to set the target model to be one of the input models (previously it had to be a new model). This means that you can perform the operation using less memory, which will be advantageous if you are merging very large models. Additionally, a new option has been added to model merge that allows the user to merge coincident nodes at the same time.

Bugs fixed in release 9.3

- **Case 11372**

If, when merging two models, one contained *AIRBAG_REFERENCE_GEOMETRY cards but did not contain corresponding *NODE cards, then the lines of nodal data in the reference geometry definition would not be copied over to the output model of the merge.

The same problem would have applied to the shells of a *AIRBAG_SHELL_REFERENCE_GEOMETRY definition.

Both of these problems have now been fixed.

Bugs fixed in release 9.3 RC2+

- ***Case 11027***

*PRIMER may lose cross references from *SET_NODE entities after a node merge operation, possibly leading to incorrect results from Find Attached. This has been fixed.*

Meshing

Bugs fixed in release 9.3

- **Case 11151**

New shells created using a split operation are now created in the parent layer instead of in the current layer. The same is done for beams as well.

- **Case 11150**

Splitting shell meshes by line is now done in the screen coordinate system, not the shell local coordinate system. This now makes shell splitting much more robust.

Bugs fixed in release 9.3 RC2

- ***Case 10180***

When splitting shells by line the line was drawn in white instead of the current sketch colour. Also, splitting a single shell by line could have crashed PRIMER. These have now been fixed.

Miscellaneous

Enhancements made in release 9.3

- **Case 11815**

This case is logged for PRIMER, but it affects all screen-menu based OASYS software that writes checkpoint (CP) files.

These files have been enhanced so that they include the resolution and physical properties of the display on which they are recorded.

This should make it easier to play back CP files sent by clients since, historically, some files have failed to play back correctly when the display on which they are being run does not match that on which they were recorded.

This is effectively a debugging change that does not require any action on the part of users.

- **Case 10825**

A 'Save as' option has been added to the preferences editor so that it is now possible to save program preferences to a user-defined path.

- **Case 9183**

Historically PRIMER has allocated memory dynamically when a model is read in, and when the model is deleted this space is returned to internal free stacks, but not to the operating system.

This is done to prevent memory fragmentation, as it means that if another model is read in the space returned from the previous one is reused efficiently without asking the system for more space.

The disadvantage is that it can make PRIMER a memory 'hog' when a large model is read and then deleted without some other model subsequently being read in. On machines with limited memory this uses up resources and can, when taken to extremes, cause problems for other processes.

Therefore on Windows and Linux platforms, where the system dynamic memory routines are capable of returning released space to the system-wide free memory pool, PRIMER will now release this memory if it is able to do so.

However on Unix platforms, where once memory is allocated to a process it cannot easily be released, there is no change in behaviour since it would not bring any benefits.

This is only a partial solution, since memory for a given storage class is only freed if all 'leased' space has been returned, which means in practice only when all models have been deleted from memory.

The extra effort required to identify 'chunks' of memory that could be freed when only one of two or more models has been deleted would be prohibitive.

- **Case 8338**

PRIMER now has coding to trap fatal system errors such as divide by zero, segmentation violation, etc, which would previously just have terminated execution with only a core dump to show for one's efforts.

The code has been re-organised so that the 'stack frame' at the initial top level is saved, and if any of these errors are encountered it makes a 'long jump' to this saved frame, discarding the current frame, making continued execution possible.

The user is offered various options, including attempting continued execution (with the warning that this may fail) with and without writing out an emergency keyword file dump of all current models.

This is not a perfect solution to the problem since, even with an emergency dump, work currently in progress (eg airbag folding, dummy positioning, spotwelding, etc) may still be lost since it is not captured in the keyword output file. In addition continued execution may not always work (the outcome varies between operating systems because of their technical differences).

However it is considerably better than nothing and, combined with checkpoint files, should give users a reasonably good chance of recovering their work in the event of a crash.

- **Case 7807**

Version 9.3 RC3 now contains preference options that apply to all programs using the prefix 'oasys*'. At the moment the following preference options appear under oasys*

file_names
maximise
placement
start_in
display_factor
display_brightness
display_saturation
font_size
font_type
left_handed
zoom_factor
laser_paper_size
laser_orientation
laser_mode
laser_insert_file
laser_top_margin
laser_bottom_margin
laser_left_margin
laser_right_margin

All of these preferences are still available under the individual programs and they over-ride the 'oasys*' settings.

Enhancements in release 9.3 RC2/RC2+

- ***Case 10567***

If PRIMER encounters a fatal error (divide by zero, segmentation violation, etc) that previously would have crashed the code it now jumps to an error handler where you are given the option of writing out keyword files of all models before terminating. This facility is experimental, and may not

work on all platforms (it is known not to work on HP-UX in 64 bit mode), and will be developed in future releases to give more options. The existing checkpoint file capability is unaffected.

Enhancements in release 9.3 RC1

- ***Case 9623***

In the generic renumbering panel for item types the 'base offset' number would change to zero after a relabelling operation. It has now been changed so that it is always the lowest label for that item category.

Bugs fixed in release 9.3

- **Case 12243**

PRIMER could crash if the user tried to make a new assembly in the part tree when the 'Autohide assemblies' option was set. This is now fixed.

- **Case 12054**

Mass on nodes which are attached to a part by a nodal rigid body was not being included in the 'include file mass' function off the part tree popup. This has been fixed.

- **Case 12040**

PRIMER would crash if you tried to activate the preference 'transfer_data_type' or tried to select/change the preference 'plot_border'. These problems have been fixed.

- **Case 12027**

Using shortcut key 'C' to close all windows was failing to tidy away the tabs. Consequently, unexpected errors could occur if any of these tabs was used. This is fixed.

- **Case 12017**

PRIMER was incorrectly calculating added mass for spotweld (MAT100) beams. These require a calculation that uses DT (if specified) on the material card which should equal or exceed the value of DT2MS. This is now fixed. Percentage added mass quoted by PRIMER uses the sum of spotweld added mass and added mass on non-spotweld elements.

- **Case 12001**

The option HEADFORM was missing from the list of eligible item types in the selection menus for ORIENT and (Add to) Clipboard. It was present in release 9.2, and seems to have been deleted accidentally at some stage in the V9.3 development process. It has now been restored in both contexts.

- **Case 11930**

PRIMER now computes the correct timestep for elements made of material *MAT_WINFRITH_CONCRETE.

- **Case 11853**

In the command line syntax

```
/VIEW DELETE <view id>
```

the command would fail on most systems claiming that the view number input was outside the valid range. This was due to a typing error, and has been fixed.

- **Case 11755**

ls <pathname> did not work properly for Unix machines when listing files in the read command line option. This has been fixed.

- **Case 11704**

When in batch mode, with no graphics active, a command that 'sketches' on the screen can cause a crash. This has now been fixed.

- **Case 11680**

Model buttons could disappear in Model->list when deleting of a model caused the slider to unmap. Corrected now.

- **Case 11602**

When a *SET_GENERATE definition referred to a list of items that had two or fewer items, and the range specified had an upper bound less than the highest label, then PRIMER might consider that the set contents were empty. (It would depend on the details of the labels chosen.)

This would not have affected the output file directly, but it could have affected operations that spooled through set contents. This has now been fixed.

- **Case 11535**

A bug in PRIMER meant that adding SPH elements onto the *DATABASE_HISTORY_SPH panel could add latent SPH elements into the model, and cause the database history data to be incorrect. Corrected now.

- **Case 11429**

If using *MAT_WINFRITH_CONCRETE_REINFORCEMENT card with the option to define a range of elements this card applies to, model operations such as RENUMBER and DELETE might not work as they should due to the reference between the material card and the element. Corrected now.

- **Case 11199**

Creating a mesh by offsetting shells would occasionally produce erroneous results in previous versions of PRIMER. This has been fixed.

- **Case 11174**

Versions of PRIMER, D3PLOT and T/HIS prior to the final 9.3 release could lose buttons and windows after very long sessions on Windows platforms only. This problem was caused by the program exceeding the OS specific number of allowed GDI objects. This problem has been fixed in the final 9.3 release by reducing the number if GDI objects the menu system uses.

- **Case 11167**

Optional cards 3 and 6 for MAT types 67 and 68 are now supported in PRIMER.

- **Case 11137**

Oasys software could reach the GDI limit on a windows machine with heavy use. This in turn could lead to a crash. Oasys software has been updated to use a vastly reduced number of GDI objects. (see also case 11174)

- **Case 11124**

PRIMER now calculates element timestep for material type 181

- **Case 11097**

PRIMER has been corrected to permit any all of the beam options PID/OFFSET/ORIENTATION/WARPAGE. The previous limitation to 2 options having been removed. The options THICKNESS/SCALAR/SCALR/SECTION remain exclusive.

- **Case 11047**

Timestep calculation for discrete beams of MAT66, MAT67, MAT68 MAT71 and MAT74 has been added.

- **Case 11033**

On the *DEFINE_COORDINATE_SYSTEM_NODES card there is a new field 'DIR' which, if filled in, defines the axes to be assumed by vectors N1N2 and N1N3.

As initially coded PRIMER read and stored this flag, but did not apply it during its internal calculation of axes for display and other computation purposes (effectively reverted to dir = X for all

cases). Among other things this resulted in the system axes being wrong when drawn for dir = Y or Z. This has now been fixed.

- **Case 10911**

Where a deck contained many *LOAD_SEGMENT cards referencing load-curves each such card generated a line of 'cross reference usage' when the load-curve was output, making the keyword output deck unnecessarily verbose and large.

This happened because previously *LOAD_SEGMENT was implicitly unlabelled, and cross-reference listings were truncated; but in recent versions of LS-DYNA they can now have an optional ID (label), and the change in internal logic to support this bypassed the truncation check.

Therefore cross-reference listings for load-curves have been made more discriminating as follows:

1. Where items have explicit labels then each reference to the load-curve is listed separately (no change to existing behaviour).

2. Where items have no label then a simple summary of how many items of that category reference the load-curve is given. (A simplification of existing behaviour.)

3. For items with optional labels an explicit reference is written if the user has supplied a label (case 1 above), otherwise a simple summary of how many such items reference the curve is given (case 2 above).

- **Case 10909**

At present PRIMER writes an error message to the screen and the controlling terminal if an attempt to allocate more memory from the system (a 'Malloc' operation) fails.

In some circumstances this failure is not detected while processing a large number of operations resulting in a stream of identical messages which, for a large model, can take a very long time to write.

Therefore the memory allocator has been modified so that the first failure during an operation now produces a single error message, the second produces a warning that 'no more error messages will be written', and thereafter nothing further is output until the operation completes.

This will not cure the underlying failure to allocate memory, but it will at least make the process of reporting it less verbose. This is the same problem as case 11048, and fixing that has also fixed this problem.

- **Case 10869**

On some Linux platforms on which system libraries are not up to date executables which attempt to link in the Motif library (libXm) dynamically will fail, either because it is missing altogether or because there is a version mis-match.

All Oasys Linux executables are now built with the Motif libraries linked in statically (i.e. libXm.a), and this should solve the problem.

- **Case 10636**

A generic solution has been developed for the problem of divining that a node is used in a SET_GENERAL or SET_GENERATE. These definitions are more difficult than conventional sets because PRIMER does not have an internal cross-reference and consequently requires a potentially expensive lookup operation per node. All core node handling functions (such as lookup to see if node is on Nodal Rigid Body) now account for SET_GENERAL/GENERATE in all contexts.

- **Case 10555**

On Unix and Linux platforms a problem can arise when editing the comments in a file (Include, Edit comments) if PRIMER is running in batch mode, or has been started from the Oasys shell.

If the default system editor is a screen-based one that creates its own window then all is well, but if it requires a terminal window in which to run (e.g. 'vi' or 'vim') then it will fail if the process has no controlling window.

One possible solution to this problem is to set the user's EDITOR environmental variable to a window-based editor, however this may not be desirable or the system may not have such an editor.

Another possible solution is to set the `'primer*text_editor'` option to such an editor. However this will fail in the circumstances described above if the simple executable name of a process requiring a terminal window (e.g. '/usr/bin/vi') is used, since there will still be no controlling terminal.

Historically the solution of creating an 'xterm' in which the editor can run has been possible only by creating a separate script, and referring to that, however the execution of this preference has now been changed so that 'text_editor' strings starting 'xterm ' are treated as raw commands rather than filenames, meaning that something like:

```
primer*text_editor:  xterm -title 'Edit comments' -e vi
```

which will start the 'vi' editor in an xterm window, will now work.

In addition the routine which attempts to start the text editor has been modified to try several different methods, dropping through to the next one if the previous attempt didn't work. Previously it would give up after one method failed to be successful.

- **Case 10378**

The experimental error handler introduced in release 9.3RC2 (which traps system errors such as SIGSEGV and attempts to deal with them gracefully) now functions on all platforms. Previously it did not work on HP-UX 64 bit.

The range of options following an error has also been extended from the original 'emergency output and exit' so that normal continuation, with or without emergency output, can now be attempted.

The actual outcome of continuing 'normally' after an error will depend both upon the nature of the error and the hardware / operating system, but experience suggests that it can be reasonably successful.

- **Case 9649**

PRIMER remembers the last local system type that was used to create a DATABASE_CROSS_SECTION card using the 'Auto Create' option.

Bugs fixed in release 9.3 RC2+

- ***Case 11115***

*PRIMER could crash when carrying out some operations (such as right clicking on a part) with a model containing *ELEMENT_INERTIA's. This has been fixed.*

- ***Case 10913***

The function that sets material ids to match part ids was not working in RC2 when the material on the part card was latent (missing from the model). PRIMER was deleting the material and the part. The similar function for sections also did not work, but with less severe consequences. These have both been fixed.

- ***Case 10681***

*PRIMER would give an error when trying to create *PART_MODES when more than one model was present. Corrected now.*

Bugs fixed in release 9.3 RC2

- ***Case 10325***

*Field C30 was omitted from card #2 of *MAT_HYPERELASTIC_RUBBER. This has now been added.*

- ***Case 10297***

*Previously PRIMER treated *CONSTRAINED_JOINT_TRANSLATIONAL_MOTOR in an inconsistent fashion:*

1. *Internal copy or edit operations, and keyword output, would set node #4 to zero.*
2. *The internal check functions would treat N4 = 0 as an error.*

Both were wrong! Tests have shown that LS-DYNA is happy for these joints either to have or to omit node #4, so PRIMER has been amended to conform to this: N4 is no longer culled if present, and its absence no longer triggers an error during checking.

- ***Case 10290***

*Corrected some bugs with *CONSTRAINED_JOINT creation. Checks were being mis-applied to newer joint types. PRIMER would not allow negative inputs for the COUPL field. These are now corrected.*

- ***Case 10231***

*The *CONSTRAINED_LAGRANGE_IN_SOLID card had a few problems:*

- *Its editing panel would not show all 'latent' fields as blue on grey, nor would undefined venting sets (NVENT > 0) show up as red.*
- *It could not be selected for deletion under the REMOVE tool, nor in a few other more obscure contexts.*
- *(Potentially random error messages, or a crash, could occur if venting lines were present (NVENT > 0) and some standard operations were carried out. It's hard to be precise about which operations would be affected.*

These problems have all been fixed.

- ***Case 9978***

*If a *SECTION_SHELL card was used for a *PART card that referred to *MAT_FABRIC and the fabric material used FORM 3, 4, 13 or 14 then the section card had to have ICOMP=1 and 2 BETA angles must be defined. PRIMER lost the 2nd angle if NIP was 1 on the section card. This has now been fixed.*

- ***Case 9930***

Mass calculation for glue materials (138, 184, 185) which have the option to express density in units of mass/area was not supported. The solid element mass calculation routine has now been corrected, on the assumption that the elements are 8 noded solids and the area is described by nodes 1…4.

- ***Case 9921***

*PRIMER was reordering *INTEGRATION_SHELL data into descending order through the shell thickness. The reordering meant that integration points could reference incorrect beta angles on the section card. PRIMER 9.3 RC2 does not re-order them.*

- ***Case 9880***

*PRIMER was incorrectly handling values of zero entered for *ELEMENT_SHELL_THICKNESS. Zero actually means use the corresponding thickness on the relevant *SECTION card. PRIMER was also ignoring thickness values specified for *ELEMENT_SHELL_BETA which should be treated in the same way. These are both fixed. The fix affects contoured values and also mass calculation.*

- ***Case 9618***

If a SET_GENERATE exists in which the highest referenced item label exceeds the highest label of an actual item in the model, entity creation operations would, without warning to the user, create items which were implicitly included in the set. This could have unexpected modelling

consequences. Should this issue occur in PRIMER9.3RC2, the user will be prompted (once) as to how he wants to define the highest label in the model for subsequent operations. Also logic has been added to the RENUMBER SELECTED function so changes in contents of SET_GENERATE resulting from renumbering can be detected, displayed and, if necessary, fixed.

- ***Case 9485***

PRIMER's check for overlapping nodal-rigid-body constraints did not account for those defined by SET_GENERAL or SET_GENERATE. The model check now has an up front pass to decompose these sets (which is potentially a slow operation and therefore not suitable for the individual check) and will find any such errors.

- ***Case 8584***

When creating a part a label is now automatically given based on the 'first free', 'highest in layer' etc. label options (in the same way that labels are automatically given for elements). This is remembered for the next invocation.

Bugs fixed in release 9.3RC1

- **Case 9515**

*Some slightly obscure errors in *MAT(erial) processing have been corrected:*

1. *A few orthotropic materials would not have had their explicitly defined axes oriented correctly during Rotate operations.*
2. *Explicit (cases AOPT = 1 or 4) orthotropic material coordinates would not have been changed when material units were changed.*
3. *MAT_ADD_EROSION and MAT_NON_LOCAL would not have been modified when their materials were oriented, nor would their units have been changed.*

These have all been corrected.

- **Case 9514**

*Field <tfailm> had been left out of the *MAT_ADD_EROSION card, and would be neither read, edited nor written. This has been corrected.*

Model Modified

Enhancements made in release 9.3

- **Case 11896**

The 'find modified' function has been enhanced so that users can find modified includes for models built by PRIMER. The function 'compare to disk' is available from the dropdowns of the include tree. The current incarnation of each include is separately compared with the on disk file.

Bugs fixed in release 9.3

- **Case 11959**

Model modified did not find an unlabelled item (e.g. rigid body merge) that was only present in one model when comparing 2 models.
This was because the special logic that compares unlabelled items incorrectly assumed that there would be at least one item in each model. So the case where there is 1 rigid body merge in the first model but no rigid body merge in the second model was not found.
This has now been fixed.

- **Case 11950**

If model modified was used on a model which originally had latent item(s) and they had been deleted, it would incorrectly give the message that the item(s) had been created. This has now been fixed.

- **Case 11748**

Model modified will now check the *TITLE and *KEYWORD card for changes.

- **Case 11002**

If model modified was used on models containing *LOAD_BODY cards PRIMER could incorrectly identify that the include file containing them had changed. This has now been fixed and additionally individual load body cards can now be identified by model modified.

- **Case 10917**

When PRIMER did a 'model modified' on a model which had lots of spotweld beams which no connection points had been created for, no differences are found. However, if a model check is done PRIMER makes the connection points for the spotweld beams and 'model modified' will now say that lots of connections have been created and that includes have changed (which they have!). Some people found this confusing as they didn't care about the connections and couldn't see why PRIMER thought that include files had changed.

The behaviour has now been changed. If PRIMER makes connections during model checking a special flag is set on them. In 'model modified' these connections are silently ignored. However, if instead of doing a model check the user presses the 'Connections' button then PRIMER assumes that you actually want connections and so the connections that PRIMER makes will NOT have the special flag set on them so PRIMER will flag them as differences in 'model modified'.

Bugs fixed in release 9.3 RC2

- **Case 9958**

Model Modified could crash if a model contained certain *DATABASE cards. This has now been fixed.

Orient

Bugs fixed in release 9.3

- **Case 12181**

Copy-orient function was incorrectly copying the contact when the same part option was set. This is now fixed.

- **Case 11922**

PRIMER would orient *INITIAL_FOAM_REFERENCE_GEOMETRY.
This has now been changed and now PRIMER will NOT orient it.
The only thing that could cause problems is scaling and so a warning is now given if the user tries to scale *INITIAL_FOAM_REFERENCE_GEOMETRY.

- **Case 11660**

When multiple orient drag operations were undone using the 'Undo' function, PRIMER was only applying the inverse translational transform of the last translation. Whilst this does not affect coordinates as these are restored forcibly on undo, it meant that, for example, undoing the orient of a DEFINE_VECTOR that had been multiply dragged did not work properly. This is now fixed.

- **Case 11349**

PRIMER was incorrectly applying orient to axes on MAT34 card when AOPT=2 or 3. This is incorrect if the reference geometry applies.
PRIMER now excludes orientation for this material if any shell or node to which it applies possesses reference geometry.

- **Case 11189**

During ORIENT, dragging a problem could arise if the current view was exactly down a global axis and the element mesh of the items being dragged were also aligned in the global axes.

This was caused by the 'Exclusive OR' (XOR) dragging mode which could cancel out the display of coincident lines.

The display method used during dragging has been changed to avoid this problem, and mesh lines should now be visible regardless of the current view or the mesh orientation.

- **Case 11123**

LS-Dyna can define a coordinate system CID on a *DEFINE_VECTOR. Orient operations on CID were incorrectly changing the vector card. This has been fixed. If vector has CID defined that will carry the affects of orientation.

- **Case 11034**

When using the 'drag' method of ORIENTing something if the user exited from the ORIENT box without formally ending the drag operation then the PRIMER cursor mode remained stuck as 'Drag object'. This has now been fixed.

- **Case 10674**

Multiple orient copy on model with parameters could crash on some platforms. This has been fixed.

- **Case 10581**

Copy orient has been slightly modified so that one only need specify an (optional) start label for copied items

- **Case 9851**

When dragging items in the ORIENT menu it has historically been a problem that the 'Xor' graphics mode used meant that some lines did not appear if the view was exactly down one of the global X/Y/Z axes. This was particularly noticeable when whole models were being positioned, as their bounding boxes would 'disappear' from these viewpoints because coincident lines effectively rubbed each other out.

The graphics method used has been changed slightly so that 'Xor' mode is no longer used, and this 'rubbing out' behaviour no longer occurs. This should make it easier to drag objects precisely during 'Orient' operations.

- **Case 9843**

Historically PRIMER has not rotated restraints, constraints and certain other keywords which are defined in explicitly global directions during an ORIENT operation. (Examples are restraints on *NODE or *MAT_RIGID cards, *BOUNDARY_PRESCRIBED_MOTION, and so on.)

The reasons for this are that rotating such definitions would require substantial changes to, or deletion of, existing cards; and possibly creation of new ones. Not only would such changes represent a major modification of a model, but they would not 'undo' as a result of an inverse transformation. And often the user may not in fact want his restraints rotated to some new local system.

Therefore the status quo remains: PRIMER still does not rotate or reflect such definitions during ORIENT operations.

However it now lists all such definitions selection for orientation which have not in fact been rotated, and reports them when the orientation is confirmed. This should make it easier for users to identify definitions which need to be modified by hand.

The following is a list of definitions detected:

*ALE_REFERENCE_SYSTEM_GROUP (if constrained in < all axes)
*BOUNDARY_PRESCRIBED_MOTION
*BOUNDARY_SPC
*CONSTRAINED_GLOBAL (if constrained in < all axes)

*CONSTRAINED_INTERPOLATION (if not all DoFs)
*CONSTRAINED_LINEAR_GLOBAL (if not ditto)
*CONSTRAINED_NODAL_RIGID_BODY (if constrained in < all axes)
*CONSTRAINED_NODE_SET (if ditto)
*CONSTRAINED_RIGID_BODY_STOPPERS (if explicit global axis)
*CONSTRAINED_SPLINE (if constrained in < all axes)
*CONTACT_RIGID (if movement defined in global direction(s))
*CONTROL_COUPLING (if any 'flip' options used)
*CONTROL_IMPLICIT_SOLUTION (if globally aligned arc length set)
*DEFINE_BOX_DRAWBEAD (if global weld axis used)
*ELEMENT_SENSOR (if triggered by motion along global axis)
*INITIAL_VEHICLE_KINEMATICS (is never oriented anyway)
*INTERFACE_SPRINGBACK (if nodes restrained in a subset of global axes)
*LOAD_BODY (if globally applied)
*LOAD_DENSITY_DEPTH (implicitly uses global axes)
*LOAD_GRAVITY_PART (ditto)
*LOAD_MOTION_NODE (if on a global axis)
*LOAD_NODE (ditto)
*LOAD_RIGID_BODY (ditto)
*MAT_RIGID (if restrained in a subset of global axes)
*NODE (if SPCs applied in a subset of global axes)
*PERTURBATION (inherently global)
*TERMINATION_NODE (if along global axis)
*TERMINATION_BODY (ditto)

Bugs fixed in release 9.3 RC2+

- ***Case 10693***

An error message saying 'Model 0 doesn't exist' was sometimes printed when clicking in the node input boxes for Orient->Trans/Rot. This is a harmless error message which was printed spuriously.

Bugs fixed in release 9.3 RC2

- ***Case 10366***

*When an ORIENT operation contained a rotation, and a *DEFINE_BOX definition was rotated, the graphics showing the position and shape of the box did not update correctly, although the box was correctly resized.*

This was due to the fact that box rotation requires special logic (because of the way they are defined) which is applied in a post-orient phase. This was working correctly, but it was not telling the graphics driver that cached graphics of the box in its original position were now invalid, therefore the image was not updated. This has now been corrected.

- ***Case 10287***

Part layers got confused when copy-orient was applied to models containing connection entities. This has been fixed.

- ***Case 8644***

When using ORIENT, SCALE PRIMER generally does not scale scalar 'length' dimensions since, for the most part, this would not be appropriate. However this meant that the optional 'finite length' dimensions for rigidwalls were not scaled. Therefore this logic has been modified and rigidwalls with finite dimensions Are now all scaled during ORIENT. These are:

<lenl>, <lenm>	*for GEOMETRIC_FLAT and PLANAR*
<lenl>, <lenm>, <lenp>	*for GEOMETRIC_PRISM*
<radcyl>, <lencyl>	*for GEOMETRIC_CYLINDER*
<radsph>	*for GEOMETRIC_SPHERE*

Because different scale factors can be used in each of the global (X,Y,Z) axes the method used is:
- *project a point of <length> along the relevant axis*

- *treat this as a vector and scale its (x,y,z) components*
- *recalculate modified vector length use as updated <length>*

Asymmetric scaling is dealt with for CYLINDER and SPHERE wall radii as follows:
- *For Cylinders, the L axis is used when projecting <radcyl>.*
- *For Spheres, the N axis is used when projecting <radsph>*

Bugs fixed in release 9.3RC1

- ***Case 9422***

Previously, orientation of a contact defined with a segment set, resulted in the orient being applied to segments. This has been changed so that orienting a contact has no effect on segments (just as it would have no effect on shells).
The old behaviour meant that orienting a part (which consequently oriented its contact) could also move elements of parts on the other side of the contact. This has now been prevented.

- ***Case 9149***

The orient into contact function in PRIMER9.2 was broken for the case of orient across different models, when the item to be oriented was Model or Include file. The reason being that the orient selection failed to exclude the 'ghost' part that is created to simulate a contact within a single model. This is now fixed.

- ***Case 9056***

DEFINE_COORDINATE_NODES were not being oriented. This has been corrected. Orientation, unit change and flagging of these are now consistent with other types of DEFINE_COORDINATE.

Parameters

Enhancements made in release 9.3

- **Case 11561**

The ability to suppress *PARAMETER usage during keyword output has been added.

This is not the default, but if it is selected then wherever a parameter has been used on a data card its underlying value is written out instead. (The *PARAMETER cards are still written out in the normal way.)

Bugs fixed in release 9.3

- **Case 12043**

Prior to release 9.3 PRIMER required that parameters should be defined in input decks before they are used. However ls-dyna 971 removes this restriction, so PRIMER has also been modified to accept this.

Parameters may now be used before they are defined: on input a value of zero is used, and when input is complete the model is revised to substitute the actual parameter values once known.

It is recommended that this practice be avoided since, although it works, it requires PRIMER to perform extra work thus slowing down the reading phase; and in the particular case of parameters used in files subject to *DEFINE_TRANSFORM a lot of extra work is required.

In addition there are a few (rare) theoretical cases where inserting zero in a data field may cause problems on input. These are very unlikely to be encountered, but nevertheless it is best to avoid the potential trouble.

- **Case 11916**

The type of a PARAMETER can be either integer (I) or floating point (R). Unfortunately the use of 'R' (from the fortran 'Real' data type) confused some users who expected to be able to use 'F' for 'Float' in PRIMER. Therefore two changes have been made to the parameter editing panels:

1. They will now accept 'f' or 'F' in lieu of 'R', changing it silently to the latter.
2. A popup menu has been added to make the selection of parameter type easier.

- **Case 11560**

Using the clipboard to transfer PARAMETERs from one include file to another (or the master file) worked, but was not easy because they were missing from the menu of eligible categories under ADD, and therefore the only way to add them to the clipboard was by showing 'all model contents' and selecting from there.

PARAMETERs have now been added to the menu list.

- **Case 11481**

We have had a report that *PARAMETER_EXPRESSION cards would sometimes fail to read correctly if 2 or more such definitions were provided under a single keyword header. The same report also stated that expressions which referenced other parameters could fail to evaluate correctly if the parameters did not use the (supposedly optional) '&' prefix.

Both these problems have been checked out on a variety of operating systems, and all seem to work correctly in the 9.3RC3 build, therefore this bug - whatever it may have been - seems to have disappeared and is now regarded as closed.

- **Case 11359**

If you have a completely empty model (i.e. just done Model, Create) then parameter expressions referencing other parameters generate error messages.

Adding anything to the model, even a solitary node, makes it work properly. This has now been fixed.

- **Case 11153**

If the clipboard was used to copy a subset of a model which used parameters to a second model, an error or a crash could occur during the creation of the second model if the referenced parameters were not explicitly loaded onto the clipboard.

This was due to inconsistent internal treatment of 'latent' parameters and has now been fixed.

- **Case 10237**

In versions of PRIMER prior to 9.3RC3 parameters were not supported during the editing of time-history blocks. This was an anomaly brought about because of the way these are processed internally.

This restriction has now been lifted, and parameters may be used in this context in exactly the same way as in any other editing panel.

Bugs fixed in release 9.3 RC2+

- ***Case 10983***

*If a model contained any *INCLUDE_TRANSFORM cards then a crash occurred if it also contained any parameters in include files (as opposed to in the master file), whether or not the parameters were used in include transforms. This has now been fixed.*

Bugs fixed in release 9.3 RC2

- ***Case 9971***

Parameters used on the second and subsequent lines of

**CONSTRAINED_GENERALIZED_WELD cards got lost. They would be written out with the correct values, but not as '&name'. This was due to an internal error which assigned parameters to the wrong row of input, which has now been corrected.*

- ***Case 9255***

There was a report that in release 9.2.1 a parameter definition mysteriously moved from the master file to an include file. We have not been able to reproduce this, but the treatment of parameters in PRIMER 9.3 RC2 has been greatly improved, and this includes specific control over the include file in which a parameter resides. In addition a 'policy' controlling the include file in which newly created parameters are placed has been added.

Bugs fixed in release 9.3 RC1

- ***Case 9353***

**PARAMETER definitions would only be read if the 'R' or 'I' was in the first column of the relevant field. This was due to a mis-interpretation of the user manual: in fact the 'R' or 'I' header can be anywhere in the parameter field so long as it precedes the parameter name.*
This has been corrected, and the code will now read parameters with these headers anywhere in the field.

- ***Case 9091***

*Error when reading *SECTION_BEAM card with a parameter in row 2 column 1, which was (wrongly) failing a numeric check. This has now been fixed.*

- ***Case 8946***

*Support for *PARAMETER_EXPRESSION in PRIMER RC1 is very limited in that it does not parse the expression, but rather converts it to 1 (integer) or 1.0 (float).*
However even this was not working properly, and 'expression' type parameters would get mishandled in a variety of ways ranging from being ignored to causing a crash.
The mishandling has been fixed, and these now work as intended, but the limitation (that the expression is not parsed) still remains.

Part Replace

Enhancements made in release 9.3

- **Case 10821**

On completion of a Part replace operation, PRIMER should warn if the target part was in an assign mass definition and prompt for some action. RC2 did not give the warning. This has been fixed.

Bugs fixed in release 9.3 RC2+

- ***Case 10943***

*Two part replace bugs arose in RC2. (1) PRIMER sometimes did not warn that *ASSIGN_MASS on the target part was about to be lost. This has been corrected. (2) With the re-project option on, PRIMER was remaking the spotwelds on the target part, but was failing to put up the table for any that failed to remake. This too has been fixed.*

Part Table

Enhancements made in release 9.3

- **Case 11578**
Part edit panel can now be accessed from a drop-down under 'Part ID' on the part table.

- **Case 11568**
It is now possible to control which columns are shown by default in the connection and part tables.

- **Case 11468**
Part Table now offers Number of Elements, and also a pop-up ONLY to display parts selected in the table.

- **Case 10951**
A new column has been added to the part table UNMERGED MASS. This gives the mass for rigid parts calculated disregarding any rigid body merges. It is useful to see the part mass for slave parts which in the PART MASS column is reported as zero, the mass having passed to the master.

- **Case 10845**
PRIMER now allows the part table to be written from the command line. Two options are available (1) to write all info (excluding graphics state) or (2) to write everything but mass properties which can take a while to calculate.

- **Case 10617**
Refresh of status data of connections on table has been improved. The data will now be updated (1) whenever the table is set up (2)whenever the refresh button is pressed (3) whenever spotweld are remade on the table.

- **Case 5651**
Part table now supports PART_CONTACT.

Bugs fixed in release 9.3

- **Case 11804**
Part table was not processing the edit of part title. This is fixed.

Picking

Enhancements made in release 9.3

- **Case 10058**
When screen-picking the 'ambiguous pick' menu was unclear in that 'WHAT' actually labelled all the possible items.

The menu option names have been changed so that WHAT becomes LABEL, and QUIT becomes ABORT, both of which reflect more closely the meanings of those options.

Enhancements made in release 9.3RC1

- ***Case 6246***

*The ability to screen-pick *CONSTRAINED_INTERPOLATION has been added.*

Bugs fixed in release 9.3

- **Case 11003**

When screen-picking solid elements with 6 or 4 nodes the message 'Bad <iface>/<nn> value in DB_FACE_NODES' would sometimes appear.

This was due to an error in determining faces for pick symbols on wedge and tetrahedral solids, and has now been fixed.

Bugs fixed in release 9.3 RC2

- ***Case 10187***

The Area Pick option 'EXT' caused confusion since, although it worked correctly as programmed, it did not select only the things the user could see, but also things on the 'far' side of objects that were external but not visible.

It has now been rewritten so that it gives a true 'What You See Is What You Pick' functionality. Only items that can actually be seen on the screen are picked, since it now uses a true 'hidden surface exclusion' test.

Bugs fixed in release 9.3 RC1

- ***Case 9404***

*The coding to screen-pick *DEFINE_COORDINATE_SYSTEM items had been omitted, making it impossible to pick them from the screen. This has been fixed.*

- ***Case 9350***

*When editing *SET_SEGMENT, and removing items from the set, screen-picking of segments failed to work if <ctrl> (wireframe) dynamic viewing was used.*
This was due to an internal error which caused sketched items (the segments in this case) to fail to be pickable following a <ctrl> dynamic view, and has now been fixed.

Reading and writing files

Enhancements made in release 9.3

- **Case 12116**

The default output format for PRIMER 9.3RC pre-releases has been LS-DYNA 970v6763.
This has been changed to the most recent version supported, which is 971R3

- **Case 11763**

PRIMER now supports command line input of Radioss block format files (version 4.1).

- **Case 11757**

The performance of keyword file input and output on a client's system when reading/writing on networked disks was slow when using Windows XP, but good when accessing the same disks using Linux.

The reasons for this have not been explained adequately, however in an attempt to improve network performance some i/o tuning parameters have been added under the 'Options' button on the Model Read panel.

These allow the user to change the buffer size used for disk i/o, and also the frequency with which progress is echoed to the screen and the user interface is polled and updated during i/o.

The user in question reported some improvement when the buffer size was increased from its default (typically 4 kBytes) to 64 kBytes, and it is possible that other users experiencing slow network i/o performance may be able to improve performance by changing these parameters.

- **Case 11536**

Keyword input read has acquired an OPTIONS panel in which the following may be set:

1. Read only a single definition following a keyword header (only applicable to (*AIRBAG, *EOS, *HOURGLASS and *MAT).

   This is to handle the cases where an older version of PRIMER is used to read a newer format input file in which extra lines have been added to card formats. Such definitions fail, even when written out 'one per header', since the excess lines are treated as the start of new definitions. By reading only one definition per header, and skipping any 'excess' lines, such decks can be read.

2. Normally severe errors encountered on keyword read are handled by 'terminate read and delete model', the latter being to prevent any internal inconsistencies in the database resulting in further errors.

   An option to change this to 'skip and continue' has been added, with suitable warnings about the perils of doing so. It may be useful when decks with new and unrecognised keywords, or other changes to existing keyword formats, are encountered where reading the deck - even if it is known to be incorrect - is important.

- **Case 11493**

Version 971 of LS-Dyna will now read 3 noded shell elements which do not define the 4th node. PRIMER can now read in these decks.

- **Case 11423**

One criticism of PRIMER has been that when an input deck generates several warnings or errors these overflow the dialogue box buffer and are 'lost', making it hard to know what went wrong.

As a result dialogue output during file input is now copied to a (scratch) log file, and a summary of #warnings and #errors is reported in the Model Read panel. A 'View log' button opens this file in the editor allowing the user to peruse any errors and warnings.

- **Case 11390**

A new option called 'include_file_paths' has been added to the Preferences panel. This enables the user to write out absolute or relative pathnames for include files in INCLUDE statements.

- **Case 11352**

When PRIMER encounters a duplicated card on keyword input, such as a 2nd *CONTROL_TERMINATION card, a popup panel describing the error will be mapped (as well as the normal error/warning + line number logging).

This behaviour is switchable via the primer*duplicated_keyword_warning preference, which defaults to TRUE.

- **Case 11297**

NASTRAN RBE2 elements with two nodes are now read into PRIMER as LS-Dyna *CONSTRAINED_SPOTWELD cards.

Conversely, the NASTRAN writer is capable of writing out *CONSTRAINED_SPOTWELD cards as RBE2 elements if the NASTRAN writer option 'Convert spotweld beams to hexa' is not set prior to writing out the deck.

- **Case 10988**

In the keyout selected panel PRIMER now tests for permission to write file in the candidate directory and applies an orange background if it is lacking. The APPLY button is also greyed.

- **Case 10850**

When reading and writing LS-Dyna files, the file selector box lists files which satisfy the extension filter '.k*' by default.

- **Case 9340**

The new NASTRAN reader supports continuation characters. Hence, all cards that span multiple lines are now supported.

- **Case 8454**

Radioss 3.1 fixed format files can now be read in from the PRIMER command line.

- **Case 8273**

As an alternative to using 'oa_pref' file options to control whether ascii file format written is 'machine native' or 'unix' (no trailing ^M symbols) an environmental variable

`PRIMER_FILE_FORMAT` possible values `'unix'` or `'native'`

has been added. There will be no effect on Unix/Linux platforms, but on Windows the use of 'unix' format will remove ^M (carriage control) characters from the ends of lines in ascii files.

- **Case 6895**

A 'Write ZTF' option has been added to the keyword file output options panel.

'ZTF' files are used by Oasys D3PLOT to extract and show additional data during post-processing.

- **Case 6083**

The new NASTRAN reader and the NASTRAN writer now support include files.
Hence, if a model is read into PRIMER and written out as a NASTRAN deck, the include file structure is preserved.

- **Case 4115**

The NASTRAN writer is now capable of writing out NASTRAN decks in both the SMALL and WIDE formats.

- **Case 3458**

The new NASTRAN input translator is capable of reading in WIDE format NASTRAN cards.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 10800***

*Added the ability to suppress the comment $PR_PART_COL written after *PART cards, which contains PRIMER's colour and other visual attributes for the part. This makes it easier to use 'diff' when comparing files.*

- ***Case 10776***

At present there is an 'ascii_file_format' option in the oa_pref file, giving the choice between 'Native' and 'Unix' file output. The default is 'Native', but if 'Unix' is chosen then files written from Windows systems will not contain <carriage return> (control M) characters at line ends.
The default option is now configurable via an environment variable `PRIMER_FILE_FORMAT` which has the same options: `'native'` or `'unix'` (omit quotes)
This is parsed before the oa_pref file is read, so any subsequent setting in the oa_pref file will override it.

- ***Case 10224***

A new button '>>> LS-DYNA output options' has been added to the write panel which accesses the settings panel for keyout options. Previously users had to set an output file name to access this.

Bugs fixed in release 9.3

- **Case 12195**

Having a Hypermesh comment where the material or section title (obtained from the HM comment) began with a '$' could cause PRIMER problems when writing the file out and reading back in, as the title would be mistaken for a comment. Corrected now to remove this $ when applying these comments as titles of materials and sections.

- **Case 12102**

PRIMER post *END entities could be labelled with -ve labels when writing out of PRIMER, if those entities were within a include transform. This would prevent PRIMER from reading them back in. Corrected now.

- **Case 12034**

*DEFINE $PR_TITLE comments were getting lost when reading into PRIMER. These are created when *DEFINE cards with titles are written out of PRIMER in Dyna versions that do not support _TITLE cards on *DEFINE cards (pre 960). Corrected now for all *DEFINE types; when reading into PRIMER these comments are converted to proper titles.

- **Case 12023**

Fixed a bug that would cause PRIMER to write out spurious lines at the end of RBE2 cards in NASTRAN decks. This would occur under some very rare circumstances when the model being written out contained *CONSTRANIED_NODAL_RIGID_BODY cards that referred to empty node sets.

- **Case 11960**

Nastran writer could create solids with zero volume. A trap has been added to calculate the volume of the proposed solid and prevent creation if it is zero.

- **Case 11749**

PRIMER wrote the _TITLE option (if set) for *CONSTRAINED_NODAL_RIGID_BODY cards when writing a 971R2 deck but the _TITLE option is not valid for 971R2. Now fixed.

- **Case 11730**

*DAMPING_MODAL cards are now written out to output decks for LS-Dyna v971R3 and above.

- **Case 11696**

The NASTRAN input translator is now able to open and read include files that contain the path relative to the master file before the file name itself.

- **Case 11439**

It was possible to lose *SENSOR_SWITCH_CALC-LOGIC and *SENSOR_DEFINE_CALC-LOGIC cards upon keyout. This only occurred if the CALC-LOGIC cards were labelled lower than the normal sensor cards they referenced, and if these cards were not referenced by a SENSOR_CONTROL card. Corrected now.

- **Case 11426**

If an input line contained a mixture of fixed and comma-separated data fields it could be read incorrectly. This has now been corrected.

- **Case 11413**

When reading in a model, usually when using include files, A PART definition in PRIMER could end up referencing the wrong material, if *MAT_WINFRITH_CONCRETE_REINFORCEMENT cards are read in before the PART is read in, and the actual material referenced by the PART is read in after the PART. Corrected now.

- **Case 11361**

PRIMER could incorrectly read in and write out the order of the nodal data for 6-noded *LOAD_SEGMENT and *LOAD_SEGMENT_NONUNIFORM cards. This has been corrected.

- **Case 11023**

When writing out relative include names PRIMER could end up writing a path containing redundant /../ bits in it. e.g.

```
../24f/../../KEY/FSC_rr_armature_023b.key
```

should be written

```
../../KEY/FSC_rr_armature_023b.key.
```

This has now been fixed.

- **Case 10892**

Although the _TITLE option could be set on *DEFINE_CURVE_FUNCTION in PRIMER, and written out, PRIMER could refuse to read this keyword in. Corrected now.

- **Case 10783**

A flag has been added that will prevent user from being asked to insert data from skip file which is in fact not associated with model he has read in, but has been created by some other process such as running old version of PRIMER in batch in same working directory.

- **Case 10451**

The new NASTRAN reader is capable of identifying missing continuation characters, and deals with them appropriately without causing data loss.

- **Case 10308**

PRIMER now uses the correct format for reading and writing *INCLUDE_STAMPED_PART_MATRIX cards. Additionally when writing a file containing *INCLUDE_BINARY files PRIMER no longer makes a file for each include.

- **Case 10022**

If an invalid label (e.g. 0) is read for any of the item types than can have character labels in LS971 (*MAT, *HOURGLASS, *SECTION, *EOS) then the error message that is generated is rather confusing.

This has been deleted leaving the normal PRIMER input error message syntax, which gives the nature of the problem and the line number.

- **Case 9849**

Subsets (assemblies) and other cards that use a name/title field in the first column of any row have been updated so as to accommodate leading '*'s for names/titles. The leading '*'s are omitted during model write. Consequently, no error is reported when the model is read back in.

Bugs fixed in release 9.3 RC2+

- ***Case 10928***

On windows PRIMER was giving a spurious error message about the keyout directory not existing. This occurred when the directory was of the format \\mcctransfer. The code has been corrected.

- ***Case 10915***

PRIMER could not read NODOUT keywords if 'HF' was added to the end of the keyword. This will run in Dyna, so PRIMER has been updated to read this in correctly.

- ***Case 10486***

Because of the order in which panels were unmapped during a keyword output operation it was possible to 'click ahead' while waiting for the file to finish writing. If performed in a particular order such impatient clicking could generate an illegal sequence of commands that would result in the user being 'locked out' of the user interface, with the 'X' (banned) cursor symbol everywhere. The code has been changed to prevent this.

Bugs fixed in release 9.3 RC2

- ***Case 10403***

When a Nastran file is written out PRIMER converts spotweld beams to solid spotweld CHEXA elements. These were sometimes generated with ill-conditioned topology resulting in negative volume. A fix has been added so that all solid topologies will be properly defined with a positive Jacobian.

- ***Case 10360***

*A bug that would have prevented *NODE_TRANSFORM cards from being written out unless *NODE or *NODE_RIGID_SURFACE cards were present has been fixed.*

- ***Case 10321***

*PRIMER was not able to read *ELEMENT_SHELL_BETA_OFFSET on keyword input. This has been fixed in PRIMER9.3RC2.*

- ***Case 10313***

The Nastran reader would fail if there was no continuation character in column 73 for CHEXA elements. Nastran required them when the reader was written, but does not now. This has been fixed for CHEXA.

- ***Case 10252***

*PRIMER would not write *PART_ADAPTIVE_FAILURE cards to output files. This has now been fixed.*

- ***Case 10242***

Model keyout in Nastran format gave node topology the wrong way round for PENTA elements, resulting in solids with negative Jacobian. This has been fixed.

- ***Case 10159***

If you added an existing file to a model as an Include Transform and it contained Control/Database cards that clash, PRIMER would complain and delete the model. This has been fixed. Now the clashing items are ignored and a warning is given.

- ***Case 10154***

*MPP Dyna (921.10838s) cannot handle multiple *ALE_FSI_SWITCH_MMG_ID definitions under a single heading. So PRIMER has been amended to write each such definition, with or without _ID, under a separate header.*

- ***Case 10015***

*For *DEFINE_TRANSFORMATION cards using ROTATE by POINT (i.e. a4-a7 are zero) PRIMER would complain if the points did not exist even if the angle to rotate was zero. In fact, if the angle is zero, LS-DYNA ignores this line in the transformation. If the angle is zero PRIMER now skips the transformation silently.*

- ***Case 9817***

*When converting *ELEMENT_SHELL_BETA to Nastran CQUAD4, PRIMER92 was writing the element shell thickness values verbatim to the 2nd line of the Nastran card. This is incorrect in the case of a zero value, as Nastran interprets zero literally. PRIMER 9.3 RC2 has been fixed to write a blank entry in these cases.*

- ***Case 9741***

An input deck that contained more than 100 laminate layers failed to read in properly. The internal buffer size has been raised to 1000 rows.

Bugs fixed in release 9.3 RC1

- ***Case 9636***

PRIMER failed to read a mixed [label][title] line (I10,A70 format) which contained a comma in the label section. This was due to the numeric label field being assigned part of the title string by mistake, as if comma-separated. This has now been fixed.

- ***Case 9501***

If the current working directory was the same as the $OASYS directory then some 'system' oa_pref file settings could be reread, superseding the values in the 'user' file.
This would only affect window management settings (eg MAXIMISE), and would probably only occur on Windows platforms when the 'start in' value of a desktop icon had been set to the $OASYS directory. The error has been fixed.

- ***Case 9440***

The default directory permission of 744 (owner: rwe, group and others: r) has proved to be a problem on Unix/Linux systems where different users in the same group wish to access files on a common project. If the parent project has the 'sticky' bit set then files created by user A cannot be processed by user B.
The ability to set an alternative directory permission mask has been added via the oa_pref file preference:

```
primer*directory_permission:  <octal code>
```

The <octal code> should be 3 octal digits in traditional Unix file permission format, for example 774 would allow group members full access.

- ***Case 9173***

When using comma-separated format for input, the test for a field being too wide was too severe in that it objected if the number of columns between commas exceeded the permitted (fixed format) field width.
This was a poor interpretation of the ls-dyna user manual which in fact says that the data contained within a comma-separated field must not breach the implicit format limit, i.e. white space before and after a legitimate number could be of unlimited extent. This has now been corrected.

- ***Case 9137***

*When PRIMER cannot recognize a keyword it puts it into a <skip_file>. The skipped data can then be optionally re-inserted on keyout. PRIMER was failing to distinguish between pre and post *END keywords and inserting all skipped data above *END. Now the distinction is made, two skip files being written if necessary, and the option to re-insert skipped data puts data in correct place.*

- ***Case 8960***

*Saved comments written in a *INCLUDE_TRANSFORM file were wrongly getting transferred into the master file when the model was written out by PRIMER. This has been corrected.*

Remove

Enhancements made in release 9.3

- **Case 10434**

When REMOVE or CLEANUP are used there will sometimes be items that refuse to delete because they are 'locked' by something else that refers to them. The post-deletion panel would list how many of each category remained, but not give any clues about why.

Therefore it has been modified so that when 1 or more items selected for deletion (or cleanup) fail to delete there is a '[?]' button which maps a new panel that lists a summary of why those items are

'locked'. This panel also has an 'xrefs' button against each such item, so that details of its cross-references can be explored.

Enhancements made in release 9.3 RC2/RC2+

- ***Case 9963***

New options for connection handling are available under REMOVE – namely CONX_ACTION. When deleting shells or parts which are attached by a connection (representing a bolt or spotweld), these options give control over deletion of the connection and its FE entities and layer data.

Bugs fixed in release 9.3

- **Case 11801**

In the REMOVE DELETE and CLEANUP panels it is possible to use '?' to examine why something was locked against deletion.

However where something selected for deletion was referenced in the 'layers' of a connection which was to remain then the reason given for being locked did not cite the connection. This was because the association in this situation is implicit rather than overt, meaning that the standard PRIMER logic did not find it.

This has been fixed by adding a special test that detects implicit membership and lists it in this context.

A second related problem was that when items making up a connection are selected for deletion the connection is also flagged, making it look as if it is to be deleted. However the default CONX_ACTION is not to delete the connection but rather to empty it, so the rather confusing situation arises that:

- A connection appears in the 'to be deleted' list
- But it does not get deleted
- And the '?' for 'why was this locked?' does not give a good reason.

This has been fixed by changing the internal logic so that when connections are flagged in this way, but will be emptied rather than deleted, they no longer appear in the 'to be deleted' list.

A final problem found was that in a model with 'realised' connections if the intrinsic part of the connection (i.e. that used to create the welds, bolts, etc) was deleted then the connection itself was (correctly) also listed for deletion.

However if the user chose to deselect the connection and 'apply' the remainder then the part and its elements were still deleted leaving the connection referring to a non-existent part via a corrupt label.

This has been corrected by ensuring that overt (as opposed to implicit) membership of a connection 'locks' such members against deletion.

- **Case 11579**

When using CLEANUP UNUSED if a Nodal Rigid Body was eligible for cleanup because all its node had been deleted then this was duly carried out.

However if any *Boundary Prescribed Motion (or some *Initial) cards referred to the nodal rigid body then either these would 'lock' it against cleanup, or would become 'orphans' referencing non-existent items.

These problems have been fixed, and cleanup (and deletion) of nodal rigid bodies now also selects any referring subordinate items for deletion.

- **Case 11211**

Previously the REMOVE, MERGE_NODES operation incorrectly merged the node of a slipring or retractor and the belt element(s) passing through it, since these are required to be coincident when the model is initialised.

Exception coding has been added so that this no longer takes place, and nodes on retractor/slipring elements will be kept separate from those on belt elements (2 or 4 noded) during a node merge operation.

- **Case 11105**

If a segment set without any underlying elements was used on *RIGIDWALL_PLANAR_FORCE, PRIMER incorrectly reported an error and cleanup was deleting the segments. These have both been corrected.

Bugs fixed in release 9.3 RC2

- ***Case 10300***

An error in the coding of certain load cards could result in unexpected selection of items to be deleted, when deleting the load card. This affected the following load cards:

- **LOAD_HEAT_CONTROLLER*
- **LOAD_MOTION_NODE*
- **LOAD_NODE*
- **LOAD_RIGID_BODY*
- **LOAD_ALE_*
- **LOAD_MOVING_PRESSURE*

- ***Case 10038***

The Cleanup Unused function was deleting sets used only in groups, regardless of whether the group was itself used for PRIMER's ASSIGN_MASS statement. This meant after cleanup, an assign mass so defined could not be remade. Cleanup function has been fixed.

- ***Case 9886***

*Automatic condensation of internal labels of *ALE_MULTI_MATERIAL_GROUP, when one is deleted, is now applied. This ensures that keywords that refer to one of these *ALE cards, refer to the correct entry. As the *ALE cards have no external label, the reference applies to the index.*

- ***Case 9863***

When a part containing elements was emptied using deletion function, PRIMER was blocking subsequent attempts to select a section card of different element type on the part edit panel. Logic has been added to handle edit of empty parts properly.

- ***Case 9750***

PRIMER could crash in some cases when deleting a model, if you had multiple models in memory. This has now been fixed.

- ***Case 9453***

*If an item was used in a *SET_SEGMENT_GENERAL definition then it would be 'locked' against deletion if that set was to be used, even if the 'remove from sets' flag was set. It has now been fixed: usage in a *SET_SEGMENT_GENERAL will no longer - of itself - lock items against deletion.*

Renumbering

Enhancements made in release 9.3

- **Case 11185**

Added command line renumbering. This permits renumbering in batch mode.

Bugs fixed in release 9.3

- **Case 11037**

PRIMER provides a correct count of the number of entities that have been renumbered once a renumbering operation has been completed.

Rigidify

Enhancements made in release 9.3

- **Case 11114**

Full popup functionality has been added to the material selection button on the rigidify panel.

Bugs fixed in release 9.3

- **Case 11631**

Rigidify function has been updated to handle a number of issues related to implementation of connections. The function will now delete connections encompassed in the volume to be rigidified and (if necessary) will remove solids from adhesive connections.

Bugs fixed in release 9.3 RC2

- ***Case 10510***

The rigidify function in PRIMER 9.3 RC1 was running very slowly, due to repeated (and unnecessary) calls to refresh the displayed object menu. This has been fixed in PRIMER 9.3 RC2.

- ***Case 9773***

The rigidify function has been fixed so that the user's default values of E and rho are applied to the rigid master part created when rigidifying part of a model.

Units

Bugs fixed in release 9.3

- **Case 11223**

On a unit change, the heat capacity parameters on *AIRBAG_PARTICLE were not being updated. Corrected now.

- **Case 10794**

Units for load curve PTLCID on *ELEMENT_SEATBELT_PRETENSIONER were being treated as DISPLACEMENT vs TIME in all cases. For SBPRTY = 4, 6 or 7, the correct units are FORCE vs TIME. This has been corrected.

Bugs fixed in release 9.3 RC2

- ***Case 9991***

If units are changed on a model with an integration beam card with NIP defined then the s and t normalised coordinates on each integration point would (wrongly) be scaled. This has now been fixed.

2.2 Known bugs remaining in Oasys PRIMER 9.3

Checking/Mass

- **Case 12227**

PRIMER calculates the added mass on spot-welds correctly when DT on MAT_100 (SPOTWELD) is positive. However, when DT is negative, PRIMER's added mass appears to be incorrect, i.e. not the same as LS-DYNA.

PRIMER currently issues an error if the absolute value of DT2MS (on *Control_Timestep) exceeds the absolute value of DT.

This is still under investigation.

Connections

- **Case 12219**

Spotweld merge refuses to merge connection points of un-made (bad) welds.
The operation will only merge connections where welds have been made (realized or invalid) and, therefore, PRIMER knows to which layer they connect. If (before merge) the same welds are re-made on the table (update and remake), those that fail the "too close" check will not be made and subsequently cannot be merged as they are "bad". This logical problem needs to be sorted out. A work around is to disable the proximity distance before the welds are re-made on the table and then merge the welds.

- **Case 12251**

Various MIG weld issues.
The ergonomics of applying these need improvement: the proximity check should be turned off when making them, buttons for invalid creation methods require removing from the panel and a more user friendly method of welding along a free edge is required (currently a node set is required). This capability is still under development.

Contact penetration checking:

- **Case 12098**

When using Contact penetration checking the number of penetrations reported for a given MAXPAR value is not exactly the same as that from LS-DYNA.

However the number of penetrations obtained from SMP and MPP versions of LS-DYNA also varies for this model, so it seems likely either that the model in question is ill-conditioned, or that the detailed geometry of penetration checking has varied between LS-DYNA releases.

- **Case 12167**

If SHLEDG = 1 on *CONTROL_CONTACT, and SOFT = 2 on *CONTACT, then the shell edges are projected as square. The effect of this is not accounted for in contact penetration plots. This problem is still under investigation.

Graphics

- **Case 8237**

Element triads do not take into account any local orientation defined on the material card (via AOPT etc), or on the element itself (via BETA etc). They are purely geometrical and based on the element topology.

Material

- **Case 12242**

Calculation of time-step (and consequently added mass) for MAT57 (LOW DENSITY FOAM) may be in error in some cases.
If the time-step of the material is calculated from the load-curve, PRIMER uses the slope of the last segment. However, LS-DYNA sometimes does not use the last segment, but the one before last. The protocol for this is being investigated and PRIMER will be corrected in due course.

Menus

- **Case 11217**

Text cut and paste does not work on Linux.
On Linux systems using the KDE environment the cut and paste buffer does not use the normal X11 methods, and PRIMER therefore will not permit text to be “dragged and dropped”.

Scripting

- **Case 12257**

A spurious warning message appears when using scripts to edit *PART_COMPOSITE.
This is still under investigation, but can probably be ignored.

- **Case 12258**

If you attempt to run a second Javascript while the first is still running PRIMER crashes.
Simple answer: don’t! A block to stop this happening needs to be added.

3 Oasys D3PLOT

This is a summary of enhancements of Oasys D3PLOT 9.3 which have been added since the 9.3 RC1 release. Details are available in the accompanying PPT slides on http://www.arup.com/dyna

Major enhancements are:

A scripting interface (Javascript) has been added:

- Any data value can be extracted for arbitrary processing.
- Javascripts can create unlimited UBIN user-defined data components
- All of the existing command line syntax can be invoked

This makes it possible to use D3PLOT as an "engine" for the processing of data in a totally arbitrary and user-controlled fashion via external programming. New data components can be created for elements and nodes based on any combination of internal and externally supplied data.

Full integration with Oasys T/HIS 9.3 has been added.
D3PLOT 9.3RC1 could only interface with the "old" T/HIS 9.2.3, meaning that only a single T/HIS window was available and the new features in T/HIS 9.3 could not be accessed.
D3PLOT 9.3 is now integrated fully with T/HIS 9.3, and in particular multiple T/HIS windows may now co-exist with D3PLOT ones.

Window layout improved, to include multiple pages.
D3PLOT 9.3 can now support up to 32 windows and, more usefully, these can be organised into separate pages in exactly the same way as in T/HIS 9.3.
As mentioned above T/HIS and D3PLOT windows can be mixed at will, and there are more sophisticated layout options available to handle this.

Settings files extended to include model and window information.
Historically settings files contained only information about the user-interface and menu settings, but have not contained model-specific or layout information.
They have now been extended so that they can become a "template" which designates not only the detailed window layout, but also which models are shown in which window. This (optional) feature can be used to open a list of models simultaneously in a specified layout, using the stored settings.

MAX and MIN vaues now shown on the display
It is now possible to list the <n> highest and lowest values in the current plot on the display.
This is user controllable in both extent and application, but by default a single max and min node or element is shown for each model in data-bearing plots only.
In addition max/min data may be exported to both WRITE and XY_DATA, the latter providing a means of plotting the envelope of max/min data over time.

IMAGES revisions and quality improvements
Historically raster images (JPG, GIF, PNG, BMP, etc) have been captured at the current screen resolution, which can prove inadequate for high quality images if your screen is small.
It is now possible to specify 2x or 4x options which will capture at these higher resolutions, producing images suitable for enlargements and presentations.
In addition the original laser plotting method, which used 2D vector graphics, has been replaced by raster capture as above. This gives an image more representative of what is on the screen, and in particular shading and transparency are of much better quality when captured in this way.

3.1 Details of Enhancements to Oasys D3PLOT 9.3

- **Case 11787**

For compatibility with PRIMER a library of Javascripts may be built in any a directory which, by default, will be:

```
$OASYS/d3plot_library/scripts
```

If found the first 40 of these will be displayed on the Javascript panel, and may be selected by a simple click.
The directory in which D3PLOT looks for scripts may be changed by the oa_pref option:

```
d3plot*script_directory:     <new directory name>
```

- **Case 11754**

If when reading a model the 'read ztf file' option is selected, but no <jobname>.ztf file is found, then a new option 'create if required' has been added.
This looks in the job directory for <jobname>.key, or <jobname>.k. If neither of these are found it looks for files matching the pattern '*.k*', and if exactly one such file is found then it uses that.
It looks to see if <filename>.ztf exists (possible if the wildcard search above succeeded) and uses it if it does.
If no such file exists it then attempts to run PRIMER to generate a .ZTF file. This requires that the $OASYS environment variable is defined, that a PRIMER executable exists in the $OASYS directory, and that the user has write permission to the current directory.
If ZTF file generation succeeds then it is read automatically. If it fails, or cannot be generated, then file input proceeds as normal without the .ZTF-derived data.

- **Case 11716**

The various contact surface stress and force components that come from .CTF files have been added to the list of 'primitive' components that can be accessed as user-defined data.
These have been added as nodal quantities only

- **Case 11448**

In the 'Close model' and 'Close window' panels a 'Select All' button has been added to make it easier to select all models/windows for closure.

- **Case 11380**

D3PLOT 9.3 contains a new feature called Compress which can be used to generate cut down PTF files. The user can select a subset of the model by Part, the states to be output and what data components to write out to the new file.

- **Case 11378**

Animations can now be saved as layered GIFs. These have the advantage that they can be inserted into Powerpoint as pictures, so don't need to be kept as separate files with the presentation.
Up to 65535 repeats can be specified, alternatively if “0 repeats” is chosen, the animation will loop infinitely.
The maximum number of repeats for AVIs has also increased from 29 to 65535. If 0 is chosen, the animation will loop 32 times as there is no infinite loop setting on an AVI file. Setting the number of loops to a high number makes AVI files very large, and users who want (near) infinite repeats should try to achieve this in their player software, or use the GIF format instead.

- **Case 11344**

D3PLOT 9.3 now handles plot files from LS-DYNA 971 which contain Airbag Particle Method data, and displays them correctly. Data on particles, and on bags as a whole, can be displayed, written and graphed.

- **Cases 11344, 11200, 10660, 10029 and 9915**

D3PLOT 9.3 now supports both SPH and Airbag Particle data from the PTF (d3plot) files.

Airbag Particles are now fully supported in D3PLOT. Their data components may be contoured and their velocities shown in Velocity vector plots. Their data values may also be extracted numerically for WRITE and XY_PLOT processing.
The type Airbag has been added as the “owner” class for these particles (in the sense that Parts “own” elements) and the data components for the airbags as a whole may also be plotted, written and used for XY plotting.

SPH elements are now also fully supported in D3PLOT. They too may be contoured, written and graphed in the same way as Airbag particle data. SPH elements belong to Parts, just like solids and shells, so no new “owner” class is required.

Both SPH and Airbag particles are supported graphically as follows:

- They are displayed in the same context as 2D/3D elements.
- Their data components may be contoured using the 2D/3D display modes.
- Their velocities may be drawn as vectors.
- They can be blanked, have their properties altered, etc.
- Their symbol type, size and quality can be controlled in Display options

- **Case 11071**

The global co-ordinates of trace nodes can now be plotted against time and can be exported to a the XY_DATA tool for plotting against time, and hence to an external curve file if desired.

- **Case 11051**

JPEG image quality in D3PLOT has been fair for shaded plots, but plots with lots of lines such as principal stress or velocities show up its limitations.
JPEG, being a 'lossy' protocol, is never going to be ideal for lines, but the default quality in the software has been increased from 75% to 90% which gives a significant improvement in image quality for a moderate increase in file size.
A 'quality' slider with a range of 10 - 100% has also been added to offer some user control over quality, but this is probably only useful for manipulating the size of AVI files using MJPEG format, since the .png format offers better image quality and file size for static images.

- **Case 10998**

Historically D3PLOT has a hard-wired set of default data components: for example X_STRESS for normal plotting, and initial data plots will default to these.
A new preference has been added:

```
d3plot*default_component:      comp_name
```

Where 'comp_name' is the name of any valid data component. Sufficient characters need to be given to make the name unique - which typically means at least two, although a full name is safer.
This component will be used instead of the hard-wired default unless:

- It is not a valid component name
- It is not valid in the plot context (eg beam component in shell context)
- It is not present in this particular database

If any of the exceptions above occur D3PLOT will revert to its hard-wired default.

- **Case 10942**

Version 9.3 of PRIMER, 9.3RC2 D3PLOT & 9.3 of T/HIS now support the use of a mouse scroll wheel.
If the scroll wheel is used within a graphics window then it will zoom in/out of the model. If the scroll wheel is used in a menu with a vertical scroll bar then the wheel will now scroll the window.

- **Case 10819**

It is possible to generate a sequence of static jpeg (or other format) files by using the Javascript interface thus:
The following script will loop over all frames in window #1, display them, and capture them in jpeg files/

```
nframes = GetWindowMaxFrame(1);
for(i=1; i<=nframes; i++)
{
    SetWindowFrame(1, i);
    DialogueInput('/IMAGE JPG example_file_' + i + '.jpg')
```

- **Case 10743**

Dynamic viewing (shift or ctrl + mouse) in any window would, historically, only update the view in that window.
If the <Caps Lock> key is depressed then this will now update all windows.
View transformations in each window are incremental, not absolute. For example a rotation of 30 degrees in window 1 will also result in rotations of 30 degrees in windows 2 to n, but from each window's current view.
To obtain identical views and transformations in all windows first 'export' the view from one window to all others (using the '0' short-cut key is the easiest way to do this), then use <caps lock> + <dynamic viewing> to transform them all together.

- **Case 9795**

The distance between two nodes (x,y,z, and magnitude) can now be exported as a time-history over states from the MEASURE command to the XY_DATA tool, and hence to a curve file if desired.

- **Case 8488**

The commands in the Deform panel were accessible from the command line with the command EXPLOSION. To tie in with the GUI this has been changed to DEFORM.
Ref Node and Ref State were not options from the command line and have now been added in.

- **Case 8356**

When running linked D3PLOT-T/HIS, static images (jpg etc) can be made of any page or window, including any graph window.

- **Cases 8007 and 3797**

Keyword-format data (e.g. deformed coordinates, stress, strain, etc) can now be written out from D3PLOT.

- **Case 7890**

A new preference has been added to set the default surface selection.

```
d3plot*surface_plot:      surface
```

This variable can be to TOP, MIDDLE, BOTTOM, MAX_ALL, MIN_ALL or MAG.

- **Case 7847**

The global co-ordinates of trace nodes can now be plotted against time and can be exported to a curve file.

- **Case 7261**

All the human readable command line commands for D3PLOT have been added as an appendix to the manual.

Enhancements to Oasys D3PLOT 9.3 RC1

This is a summary of enhancements of Oasys D3PLOT 9.3 RC1 which have been added since 9.2.3. Details are available in the accompanying PPT slides.

- ***Case 4292, Case 4378, Case 5716***

Ability to display static or movie images on window background.

- ***Case 4328***

In D3PLOT 9.3, user-defined data components can now be plotted. These are defined either
- using a formula that references existing data components such as displacement, stress, etc, together with mathematical operations
- a Javascript program that can take this further using logic operations
- read the data from a file on disk

- ***Case 4359***

D3PLOT 9.3 now uses a screen-capture method to write postscript files

- ***Case 4387***

The 'Vel' button now has a popup attached to it which permits selection of Displacement, Velocity or Acceleration, which may be plotted in 'arrow' style.
In addition if there are any user-defined nodal vector components in the model they too may be selected and plotted in this way.

- ***Case 6614***

In Write tools, we have added a feature which writes out LS-DYNA keyword at any time-state. The keywords available are:

**INITIAL_STRESS_BEAM/SHELL/TSHELL/SOLID*
**INITIAL_STRAIN_SHELL/SOLID*
**ELEMENT*
**NODE*
**INITIAL_VELOCITY_NODE*

User can select by Entities, Beams, Shells, Thick shells, Solids and Nodes.

- ***Case 6893, Case 8682, Case 9587, Case 9617***

On contour plots, annotation of nodes/elements having maximum and minimum values. This is switchable.

- ***Case 8854***

D3PLOT can now generate AVI files using MJPEG encoding on all platforms. This combines good image quality with small file size. MJPEG is now the default for writing AVI files.

(For background image display it can read BMP and MJPEG based AVI files on all platforms, and most installed CODECs on Windows.)

- ***Case 9089***

A request was made to link dynamic viewing in all graphics windows to the current one, ie all windows would respond at the same time to mouse action in a single window.
This has not been done directly because it would require an extra set of commands to control it, and also it would slow down dynamic viewing if used. Instead a keyboard short-cut '0' (the digit zero) has been added which exports the view of the current window to all other active ones. (Same as the 'Export View' command in the popup on the window's [-] button.)
This performs almost the function requested without extra CPU overhead or further commands.

- ***Case 9216, Case 9616, Case 9621***

The MEASURE function has been enhanced as follows:

A 'Recompute' button has been added. For nodal measurements this will, if all the necessary nodes have been defined, recalculate the values using the coordinates of the current state.

An 'Export to XY Plot' button has been added. This will create 4 graphs showing how [dx, dy, dz, dv] (distance) and [Txy, Tyz, Tzx, Txyz] (angle) change over all states in the model.

- ***Case 9354***

The Deform, Reference Node option has historically allowed displacements to be contoured and reported in the deformed system (e.g. defined by Shift Deformed)
This has been extended to permit 'current coordinates' in WRITE and XY_DATA also to be reported in the deformed system. This is not the default, ie the existing behaviour is unchanged, but it is now an option under Deform, Reference Nodes.

- ***Case 9503***

Synchronisation with monitor vertical refreshes is now controllable on Windows platforms, giving a typical 10% speed up of animation frame rate.
The (software) upperbound frame rate has been changed from 'No limit' to 100 frames per second to stop very small models animating ridiculously fast. This latter change applies on all platforms.

- ***Case 9705***

Added ability to define 'blob' (external data) at a node instead of a fixed coordinate.
Altered data display format for 'blobs' so that if a value is effectively an integer (to within 1 part in 1e7) it is written out as such with no decimal point or decimal places.

- ***Case 9890***

A 'match image' function has been added to D3PLOT. This allows the user to select points on the background image and associate them with the corresponding nodes in the model. When at least four such points have been defined (although 5+ points will usually give a better result) the view which transforms the structure to match the background image can be computed.

- ***Case 9943***

Uncontoured elements in CT, SI and DP plots are now drawn in medium grey (shaded) instead of black, giving a rather better looking result. Various problems and limitations with the display of spotweld beams in beam CT plots have been fixed; the Spotweld size field is now available on the main Beam plotting 'attributes' panel (previously it was hidden away in display options); and the range of sizes possible for spotweld beams has been increased.

- ***Case 10464***

On Windows platforms it is possible to double-click on a filename to start D3PLOT, or alternatively to drag a file onto its icon.

In both cases Windows convention would be that the 'current working directory' ($CWD) to which files would be written would change to that of the file most recently opened. However D3PLOT tended to stick to the Unix/Linux convention that $CWD was where the code was started from.

This has been amended so that, on both Windows and Unix/Linux, opening a file from the command line, or by double-clicking or by dragging onto an icon will change $CWD to that of the target file.

In addition the code's behaviour has been extended so that the most recently opened database (.ptf) file effectively resets $CWD. This is the implicit behaviour expected on Windows, and is now honoured, and for consistency this has also been made the case on Unix/Linux

- ***Case 10707***

The '-placement' option has been added to the command-line options.

This gives the ability to determine the screen on which D3PLOT starts in a multi-monitor setup. Arguments are LEFT, RIGHT (and also, for completeness, TOP, BOTTOM).

The existing '-maximise' option is retained. So, for example, to start D3PLOT maximised on the left hand screen of a side by side two screen desktop the options

```
-maximise -placement=left
```

should be used. These options may also be specified via the 'oa_pref' file, using option

```
d3plot*placement:    left/right/top/bottom
```

- ***Case 10738***

When multiple models are active it is now possible to export the blanking and other properties from model A to other models.
The '=>' tabs button on the BLANK panel exports blanking status, that on the COLOUR panel exports colours, and that on the PROPERTIES panel exports all 'property' status (blanking, labelling, colour, transparency, display mode, overlay mode, overlay colour).
The effect is the same as writing out a properties file from model A and reloading it into models B, C, etc.

In addition an EXPORT option has been added to MODEL row popup menus in the Part Tree, providing an alternative way of exporting the chosen properties from the selected model to all others

- ***Case 10739***

When D3PLOT was used with REPORTER, and a cut-section was defined, if the cut was specified using a node then when played back the original coordinates of the cut were used rather than those of the node in the 'playback' model. This has now been corrected:

When D3PLOT is used with REPORTER and:

- A cut-section is defined.
AND
- It is 'three nodes', or 'constant x/y/z'
AND
- It is defined by node(s)
AND
- It is not moved, so that in the original model the section coordinates are still defined by the node(s)

THEN

On playback in REPORTER the new section location will be determined by the coordinate(s) of the node(s) in the target model at the specified state.

If one or more nodes are not present in the target model then the section will revert to using its (fixed) coordinates in the original model. This change is actually to the 'settings' file reread, so it will also affect cut-section behaviour when a settings file containing a section definition is read back in during normal interactive usage.

3.2 Bugs fixed in Oasys D3PLOT 9.3

The following is a summary of bugs fixed in Oasys D3PLOT 9.3 since the release of 9.3 RC1.

- **Case 12274**

A crash could occur reading a model if a ZTF file is present containing seat-belt items, but no springs, joints or walls. This was due to an oversight, which would normally not cause an error if elements of the other type were present. It has now been fixed.

- **Case 12236**

The handling of 'plot.view' (saved view) files left a lot to be desired and has been improved:

– Feedback of the current filename now works properly, and it is prefixed with the correct pathname.

– Spurious buttons have been removed from the file handling panel.

– Misleading 'help' texts have been tidied up.

- **Case 12188**

When plotting beams with 'true' section shapes, as derived from the ZTF file, a few beams came out with their major and minor axes apparently the wrong way round.

D3PLOT synthesises equivalent 'rectangular hollow section' properties from Area, Ixx and Iyy values to give an indication of beam size and orientation. It was doing this correctly, but not translating this into correct sizes when drawing, due to numerical errors.

This would only have occurred for a small number of sections, and has now been fixed.

- **Case 12187**

When two models were animated in two separate windows with automatic contour bands and, while the animation was still running, the data component was changed, then - sometimes - one of the windows would not change its band limits.

This seemed only to happen on very high-performance machines, and then only some of the time.

It was caused by an internal synchronisation error that caused autoscaled contour limits to get out of step with underlying data, and has now been fixed.

- **Case 12082**

'Simple formula' and 'Javascript' user-defined components are based mainly on intrinsic data, referred to by acronym, used in expressions.

When tensor-based intrinsic data was used, ie Stresses Sxx .. Szx and Strains Exx .. Ezx, it was not clear how the 'Frame of reference, global/local' switch was applied.

As originally programmed element stress and strain data would be converted when the expression was evaluated, which worked well for scalar components but caused an error for tensor user-defined components since when 'local' was in force since data was extracted in the local system, and then rotated again ('local x local') when used, which is wrong.

Therefore the use of stress and strain tensor-derived data that is sensitive to the coordinate system in force has been changed so that:

- The original Sxx .. Szx and Exx .. Ezx component acronyms remain unchanged, however they now always extract GLOBAL data, regardless of the setting of the Frame of Reference switch.

- New acronyms with 'l' for 'local' have been added (Sxxl .. Szxl and Exxl .. Ezxl) which always extract Element LOCAL data, again regardless of the Frame of reference switch.

This change removes any ambiguity by making the coordinate system of the data explicit, and also improves code performance since it is no longer necessary to recreate user-defined data components when the frame of reference is changed.

Note: this change does not affect the user-defined binary (UBIN) components added in V9.3. These default to Global unless explicitly stated otherwise.

- **Case 12077**

D3PLOT has had an optional Cylindrical frame of reference (alongside Global and Local), but historically the frame of reference transformation has only applied to element tensor-derived data. Nodal vector data was not transformed to the cylindrical system if selected.

This has now been fixed: nodal vector data is now transformed to the cylindrical system if this is set. This means data derived from Displacement, Velocity and Acceleration vectors; and also any user-defined vector components.

- **Case 11270**

If a window contained more than one model, and cut-sections were active in that window, then a crash could occur if AC(autoscale) was used.

This has now been fixed.

- **Case 11951**

When using the X11 graphics driver on Linux platforms a crash would occur on initial window open or, possibly, soon thereafter when something caused a window refresh. OpenGL graphics was not affected.
This was due to an internal overwrite and has been fixed.

- **Case 11874**

Version 9.3 RC1 of D3PLOT could crash after writing PDF files due to an internal memory overwrite.

- **Case 11809**

Historically Spring/Damper and Seatbelt elements in D3PLOT have not been treated as belonging to a PART, as implied in the ls-dyna keyword file.
The reason for this is that inside LS-DYNA their materials are separate from those used for solids, shells, etc; and as a consequence the 'material' (aka part) numbers reported in the .XTF file did not tie up with 'normal' parts.
Now that we have the .ZTF file as an alternative source of data we are able to associate spring and seatbelt elements with their original parts, and D3PLOT needs to handle this.
Therefore from release 9.3 onwards, if a .ZTF file has been read then:

- Spring and seatbelt parts will appear in lists of parts in the contexts where such parts are used (eg blank, selection)
- Operations 'by part' will work on their springs and belt elements.
- Quick pick, the Part tree, the Options panel, etc will all process spring and seatbelt elements by part.

If only .XTF file data is present then the original behaviour will remain.

- **Case 11770**

The stated default for Lumped Mass visibility in the preference file is OFF, yet D3PLOT would draw them by default. (If an explicit preference to turn them off was set then this was honoured.)
This has now been corrected: the default visibility of lumped masses is now off.

- **Case 11684**

External ('Blob plot') data files in D3PLOT have not historically accepted comma-separated input, requiring instead that data fields be separated by white space.
This has now been corrected, and data may be imported using any mixture of commas or spaces to demarcate fields.
In addition if more than 1000 external 'data' points were read problems could occur, possibly culminating in a crash, because of storage allocation errors.
This too has been corrected and any number of points may now be read.

- **Case 11677**

When spotweld beam symbols were turned on these elements were drawn as two cubical 'blobs' connected by a line. However the 'blobs' were always drawn in the global system, and did not orient with the beam, making it hard to determine weld connectivity in some cases.
These symbols are now rotated to the beam local system where this can be determined.

- **Case 11640**

If two or more models are present in the database, and MEASURE is used, and the results of the measure operation are exported to XY_PLOT then all is well. However if a model is subsequently closed and reopened then any further MEASURE operations which export XY plot data may cause a crash on Linux platforms only.
This has been 'fixed' in the sense that an internal workaround means that it no longer happens, but no underlying cause has been found. It seems likely that this is a Linux system-level file handling error.

- **Case 11576**

If a user 'quick picks' 5,000,000 items (something only really possible when picking individual nodes or elements by area on huge models) he will trip a warning that his quick pick 'undo' stack is getting large.
This recommends that the 'undo' stack be emptied to save space, and offers to do this. However if the user takes this eminently sensible action the code crashes!
This problem has now been fixed.
In addition when quick picking many (as in 100,000+) items the building of the 'undo' stack on Windows platforms could become quite slow. This has been speeded up to remove the speed penalty as the stack size grows.

- **Case 11553**

If MEASURE is in use, measuring node or point angles, and one or more of multiple windows are closed, then a crash could occur.
This has been fixed.

- **Case 11550**

The addition of beam values to CT and DP mode plots, (as switched in the beam plotting attributes panel) was not working in 3D display mode.
This has now been fixed.

- **Case 11537**

When Javascript is used to create 'user-defined binary' data components (UBIN) these are cached on disk in <jobname>.ubd files.
These files are deliberately limited to 2GBytes in size, and new family members (.ubd01 etc) files are opened as required.
These were being opened and written to correctly, but re-reading of data from 2nd and subsequent family members was resulting in errors.
These have now been fixed.

- **Case 11531**

In WRITE KEYWORD selecting PART and then dragging out a screen area caused a crash.
This may or may not have happened in D3PLOT 9.3RC1, as the error crept in during the 9.3 development process. However it is definitely fixed in 9.3.

- **Case 11469**

The quality of fonts in Postscript/PDF files written from Windows, and also direct printing, was poor. In addition the line width on images captured at 2x or 4x resolution was not scaled, with the result that lines became thin to the point of near invisibility.
Both these problems have been fixed: font quality should now match that on the display (or better at 2x and 4x); and line width is now scaled by default, although users can choose to leave it unmodified if they are planning to use output on large sheets of paper.

- **Case 11419**

The 'deform, reference state' capability was getting confused by the fact that the new 'Construction stage' capability was using the element deletion flags in the database to mark elements as initially absent, but then 'undeleting' them later on.
This has now been modified so that the assumption that 'deleted' elements have no valid reference data is now qualified, and reference to an earlier state with deleted elements will now work as expected.
Some other problems with reference state logic when multiple models are present have also been fixed. In addition when 'deleted' element display is turned on these elements and nodes can now be screen-picked.

- **Case 11396**

Turning on DEFORM REFERENCE_NODES (single or 3 noded) could slow down animation by a considerable amount.
This was because D3PLOT was trying to be clever and save the 'reference' velocites and accelerations at the reference node (even when not needed) and was reading in all the nodal velocities and accelerations for each state in the process!
These data are no longer cached, since there is no advantage in so doing, and the excessive disk read has also been deleted, which restores the animation speed.

- **Case 11336**

Files containing *AIRBAG_PARTICLE output can now be processed.

  - Particles can be displayed in a variety of ways (similar to SPH els)
  - Data components can be plotted on them.
  - WRITE and XYPLOT can extract data from them.
  - They are grouped under the (new) category AIRBAG

- **Case 11331**

On some platforms a crash could occur following a model 'reopen' command. This seemed to be a function of both the machine speed and the graphical environment of the window manager on the machine.
Internally this was due to errors in repainting the 'part tree' panel, which have been fixed.

- **Case 11330**

If a settings file is written when user-defined data components are present then the parameters for these are written at its end.
If the user-defined components contain any Scalar or Vector 'Simple formulae' then the 2nd and subsequent components following these are not read correctly.
This is due to a format error on reread, and has been fixed.

- **Case 11309**

When more than one model is present in a window then the 'scale to band' and other mouse-driven options available by hovering over the contour bar didn't work.
This has now been fixed.

- **Case 11301**

LS-DYNA does not compute strain energy density (internal energy density) for anything other than thin shell elements, therefore extracting results for other element types in D3PLOT should produce zero. However the programme was producing garbage for these data (unless the special flag to compute elastic only energies was set). This has now been corrected.

- **Case 11239**

If the Display Options, Beam Symbols panel was used to change the display of beams from 'Line' to 'True section' then the plot did not update until a change of plotting mode (eg from SH to LI) was made.
This is now fixed: changing the beam display type will result in an immediate change in beam symbol appearance in all plot types.

- **Case 11175**

A crash could occur when switching to 2D graphics if the foreground (text) and background colours were the same, triggering a warning message.
This was caused by the warning message itself, and since the check was introduced for the old laser driver which has now been replaced, it has been removed this solving the problem.

- **Case 11130**

When 2 or models were displayed in a window, and cut sections were active, and 'thick' cut sections were being used, then screen-picking of items in the second and subsequent models did not work correctly.
This was originally picked up as an error in 'measure', but it would in fact affect all operations involving picking since it was due to a failure to propagate the visual offsets of the 'thick' section to 2nd and subsequent models. This has now been fixed.

- **Case 11120**

When 2 or more models were displayed in a window the part tree 'only' function would not work correctly to display only the selected model. This has now been fixed.

- **Case 11086**

When picking nodes for [Deform] Shift_defined or Reference_nodes the nodes in the menu panel did not get updated as they were screen-picked. This has now been fixed.

- **Case 11074**

Background image, movie and watermark display did not have the capability to apply a specific (variable) scale. This sometimes made it hard to get the image in the desired position. An explicit scale has now been added as an option.

- **Case 11069**

When multiple models are read into a single window the colours in the window would sometimes go 'primary' or black.
This was due to the internal 'global' brightness, lighten dark colours and saturation values getting overwritten, and a workaround is to go into the COLOUR panel and reset these values.
This problem appeared only to occur on Win32 platforms, but it could possibly crop up on other platforms as well. This has now been fixed.

- **Case 11066**

On Windows platforms the 'Export' of properties data from the current model to other models in the Properties panel could cause disk error problems, with messages suggesting illegal filenames or disk space exhausted. This has now been fixed.

- **Case 11064**

The behaviour of settings files when opening multiple models was causing problems, conflicts and confusion, mainly because the logic had not been thought through for this case. The following changes have been made:

(1) Settings files will only open additional windows if this is necessary to bring the number of windows open in this session up to the number open when the settings file was recorded.

(Previously settings files containing <n> windows would open an extra <n-1> windows regardless.)

(2) When multiple models are opened, possibly from multiple directories, it is undesirable to open more than one settings file, and previous behaviour was not defined in this situation. Therefore behaviour now is:

Loop over all models in the order in which they were opened looking for the most recent settings file (if any) in their directories. If one is found this is used, and the search terminates.
If none is found then the user's home directory is searched.
If none is found there then the $OASYS directory is searched.

This behaviour may not please all the people all the time, but at least it is determinate and therefore predictable.

- **Case 11015**

Now that 'staged construction' has been modified to use the element deletion tables to inhibit display of parts D3PLOT got confused when trying to display these since it assumed that once an element was deleted it could not come back to life again.
It has now been introduced to the concept of elemental reincarnation and will display these elements correctly no matter how often they are (un)deleted.

- **Case 11010**

In the cut sections panel the warning message that display of 'basic' space sections does not function correctly in 3D mode had been lost when the panel was reconfigured.
This has been reinstated, and the user is once more warned about this and offered the option of switching to 2D graphics mode.
In addition the change made in V92 to output 'basic' space cut section forces in the global system (to be compatible with ls-dyna) has met with some resistance.
Therefore the option to set force and moment explicitly to global or local systems has been added, although the default setting ('automatic') retains the current behaviour.

- **Case 11008**

Envelope plotting in Windows 2 to n did not select averaging OFF.
This was due to an internal error, combined with the use of 2D graphics. The error has been fixed, and envelope plotting now works in 3D graphics mode, removing the need to switch to 2D.

- **Case 11001**

When using envelope plotting if more than one window was in use, or more than one model, then state selection had a tendency only to work correctly for the current window / model, and not be set for the remainder, giving messages about 'No states selected'.
This has now been fixed.

- **Case 10973**

Envelope plotting has been reported as mapping the 'deform' window when state selection or sub-component type is used.
This has not been reproduced during testing, but several other problems have been fixed, and envelope plotting substantially overhauled to make it work in 3D mode. Maybe this has fixed the problem!

- **Case 10972**

When performing envelope plotting using 'cloud' mode plots the results for internal elements of a solid mesh were not displayed by default, although they could be seen if internal faces were switched on.
This was caused by errors in the 2D graphics used historically for envelope plots. The need for this has been removed now that they work correctly in 3D graphics, and cloud plots now display internal solid elements correctly.

- **Case 10893**

One problem with using D3PLOT session files (.tcf files) is that when a button toggles on/off due to successive clicks then, historically, each play through the session file will reverse the current status.
This has now been corrected by extending session files (from V9.3) so that they contain an extra field that stores the 'on/off' status at the time of recording, and this is now restored on playback so that the resultant button status will be the same as that when the file was recorded.

- **Case 10770**

In D3PLOT 9.2.3 and 9.3RC1 D3PLOT could crash if the preference button was used in the T/HIS menu while using the D3PLOT->T/HIS link. This has been fixed in 9.3.

- **Case 10257**

When Contours, Limiting values was used (either explicitly, or by clicking on a contour band) display was limited correctly to only those items within the bands chosen.
However when a non-data-bearing display mode was chosen the display could still show only parts which had elements visible in the previous (limited) contour plots, effecting applying 'limiting' on a per-part basis.
This was due to the internal visibility tables getting 'stuck', resulting in parts being clipped out when they shouldn't be, and has now been fixed.

- **Case 10249**

User data is fully available from the command line, including sub-components for vectors and tensors.
The THIS_INTERFACE command has changed to XY_DATA

3.3 Bugs Fixed in Oasys D3PLOT 9.3 RC1

The following is a summary of bugs fixed in Oasys D3PLOT 9.3 RC1 since the release of 9.2.3.

- ***Case 8979***

In D3PLOT 9.2 the 'locate in tree' quick pick options did not work when they were accessed via the right mouse button. This has been fixed in version 9.3.

- ***Case 9088***

In D3PLOT 9.3 user defined titles are stored in the settings file if they have been defined. If a windows title is the default one from the PTF file (including swapped titles) then it is not written to the settings file as it would automatically overwrite the title from a PTF file if the setting file was read into another D3PLOT session.

- ***Case 9301***

When replaying Reporter template files the size of the graphics window in D3PLOT was ignored. In cases where the user used the default size this wasn't an issue since the size on playback would match that when recorded, however if the user had set a particular resolution it could be annoying. Therefore when Reporter plays back template files the D3PLOT window size will now match exactly that used when the template file was recorded.

- ***Case 9310***

In D3PLOT 9.2 the full pathname of models could not be seen in the Rescan/Reread/Close model panels if the filename was more than about 70 characters. In version 9.3 the full pathname is displayed using hover text.

- ***Case 9421***

An error has been found in the reading of ASCII groups files (.asc). If the title of a group is not defined this can result in that line being ignored and the next line, which should be the label, being taken as the title, and the line after that as the label.
The symptoms vary depending upon the group contents, but usually result in the group being ignored or possibly read with the wrong label. This has now been fixed.

- ***Case 9500***

If the current working directory was the same as the $OASYS directory then some 'system' oa_pref file settings could be reread, superseding the values in the 'user' file.

This would only affect window management settings (eg MAXIMISE), and would probably only occur on Windows platforms when the 'start in' value of a desktop icon had been set to the $OASYS directory. This has been fixed.

- ***Case 9743***

Where a model contains both solids and shells, and some solid elements are adaptively remeshed, ls-dyna alters the node labels of the shell elements even if their location and apparent topology do not change.
D3PLOT rendered such shells wrongly in these states since it assumed that element classes which had not been remeshed would retain their original topology.
This has now been fixed: 'old' topology for element classes is only retained (to save memory) following a more rigorous test for the element topology remaining the same.

- ***Case 9823***

When displaying shaded or contoured plots with overlay, changing the overlay colour of springs, seatbelts, masses, joints and rigidwalls in the 'properties' panel or via 'quick pick' appeared not to work until after re-drawing in a different mode (e.g. LI then SH). This has now been fixed.

- ***Case 9826***

If D3PLOT was initially opened without reading extra (optional) data from .ctf, .xtf or .ztf files, and a group was saved, then the cached groups file (.grp) would not contain information about the extra items.

If the model was subsequently re-opened, this time reading extra optional items from .ctf/.xtf/.ztf files, then a clash between contents in the model and the cached groups file was detected and the groups were rejected.

This was an unnecessary limitation and has been removed. Now a cached groups file will only be rejected if both file and model contain different numbers of items AND these numbers are finite in both contexts.

- ***Case 9885***

*An 'ALE' analysis was specified as also having 'extra' structural data components output. (Field <neiph> on *Database_Extent_Binary card). D3PLOT confused the ALE density, volume fraction and mass output with the other 'extra' data.*
D3PLOT will now disentangle ALE 'extra' data from any additional 'structural' output.
The opportunity has also been taken to improve the handling of ALE component selection in the case of multiple models containing different numbers of Ale multi-material groups.

- ***Case 9899***

In the target markers menu 'delete all' did not in fact delete any markers. It has now been fixed.

- ***Case 9900***

2 noded seat-belt elements were displayed with a finite width that could be altered.
The actual width displayed, and the orientation of the 'wide' dimension of each element, could vary with the element's length and orientation.
This has been corrected so that the width displayed is now consistent, regardless of element size. Orientation is a 'good guess' at what will look right, but obviously these 1D elements do not have a determinate local 'in-plane' axis.

- ***Case 9922***

LS-DYNA writes out shell integration point data in a strange order for the special cases of <maxint = 3> and <maxint = 5> for shells using the default Gaussian or Lobatto integration schemes. For all other values of maxint data is written in ascending order from bottom to top, but in these two cases the order is different.
This was being processed correctly in the case of <maxint = 3>, but wrongly in the case of <maxint = 5>, resulting in the 'middle' and 'bottom' surfaces being detected wrongly. (Output by 'layer' number was correct.)

This has now been corrected so that the special 'top', 'middle' and 'bottom' surface output is correct for all (known) values of maxint.

In addition the ability to select data by 'layer', as well as 'surface', has been made available for the <maxint = 3> case. Previously this was suppressed, but it is useful in the case of laminates or user-defined integration rules to be able to select explicit layers.

- ***Case 9945***

'Overwrite' and 'New file' feature in the file selection panel was missing in XY Data. It has now been added.

- ***Case 9964***

Previously 'mixed mode' plotting, where some parts of a shaded or contoured image were rendered as wireframe or hidden, would still use the overlay attributes and colour of the main plotting mode: typically free edges with grey overlay.

This confused some users since it wasn't what they expected, so it has been changed so that the overlay style and colour in 'mixed mode' plots are now those of the mode chosen. Typically this means that items displayed in wireframe and hidden and modes in an otherwise shaded plot will be drawn in their 'native' colour with fully edged overlay.

- ***Case 10014***

If 'unattached' node labels were turned on in the Entity panel this had the effect of suppressing the display of 'all' or 'attached' node labels if they too were selected. This has now been fixed, and any permutation of node label display will work correctly.

- ***Case 10086***

If a model was currently open, and displaying a cut-section with 'true' thickness being used for 2D element capping, then the programme would crash if the model was re-opened (reread). Now fixed.

- ***Case 10162***

Using the command line method (eg /images jpeg) to write image files during Reporter capture/playback caused a crash. Now fixed.

- ***Case 10164***

On Linux platforms the use of <alt key> + <tab key> to swap between windows was causing animation to start & stop as if the space bar had been pressed.

This was due to misinterpretation of the <alt> key stroke, and has now been fixed.

- ***Case 10248***

In D3PLOT 9.2 an error message could be generated if the command line interface was used to select states for X-Y data plotting. This has been fixed in version 9.3

- ***Case 10315***

When multiple models are read in, Select All of states in Envelope didn't select all states for all models even though it appears to have highlighted all the states. Now Select All will select all states for any models that are activated.

- ***Case 10375***

When a 'settings' file was written the current model's restraints and constraints were encoded in it, with the result that when the settings file was read back in these superseded any correct res/constraint values read from a .ZTF file. This has now been fixed: import of a settings file will not update the current res/constraints; however their display settings (as set in the Entity panel) will still be restored.

- ***Case 10444***

Some laptops will not render OpenGL in dual-screen mode on their second display. This is because the graphics card on the machine does not have the capacity to provide double-buffered and depth buffered windows over that acreage of screen. This cannot be fixed since the problem is really due to a limitation of the hardware. Reducing the window size or resolution, or (sometimes) the colour depth may help.

- ***Case 10485***

When multiple models were displayed in a window, defining a cut section location by picking (a) node(s) would not always propagate down to all models in the window, resulting in only the first one being cut. This could be cured by switching cut sections on and off again.
Also if the models were offset (using Window, Edit) the display of the section, if turned on, could be in the wrong place for offset models since the 'offset vector' was applied twice. (This only applied to the display of the plane itself, the actual cut through the offset models was still correct.)

Finally if plane display was turned on it worked correctly in 3D graphics mode, but was not drawn when in 2D mode. All the above problems have now been fixed.

- ***Case 10511***

When cut-sections were generated using pure 'command line' syntax (eg /CUT CREATE etc) the graphics could fail to be updated to show the revised section until a redraw command in a different mode was performed.

This has now been fixed: changes to cut-sections made in command-line mode will now update the image in the current window correctly.

- ***Case 10583***

If nodes were labelled dynamically using 'quick pick' (either by picking or by typing in their labels) they would be displayed, but then the labels would disappear if the view was changed.
This has now been corrected: dynamic labels on nodes remain persistent, as with labels on other entity types, until cleared deliberately or the image is explicitly redrawn.

- ***Case 10601***

When performing WRITE or XY_PLOT operations on cut-section data the data component buttons would be mapped correctly when first used, but thereafter only FX would appear. A similar problem could also occur to some of the other more exotic component names in this context. This has now been fixed.

- ***Case 10635***

A crash could occur on some platforms when the plotting mode was switched to BEAM and the ATTRIBUTES sub-option was used. The actual effect, or lack of it, would be platform-dependent. This has now been fixed.

- ***Case 10670***

If WRITE was used, and the component selection panel within it also used, then menu corruption - or possibly a crash - could occur if a second model was read in and a second cycle of WRITE, select data component was performed. This has now been fixed.

- ***Case 10697***

The command line syntax for WRITE sometimes failed to select the items requested. The symptoms were either that nothing was selected, or that the most recent menu-interface selection was used in error. This has now been fixed.

- ***Case 10710***

When data was derived from Nastran (either static or Eigenvalue solutions), or from an ls-dyna Eigenvalue analysis, the picking, labelling and autoscaling of the image could work wrongly.

Symptoms would be refusal to pick or label, or picking/labelling apparently in the 'wrong' place, and autoscale not fitting the image correctly to the screen.
All these problems arose from the fact that these analysis types require a single state/loadcase/mode to be animated through 0 - 360 degrees, and the 'phase angle' of the current image in that range was being handled wrongly in some cases. This has now been fixed.

- ***Case 10725***

When 'dynamic' labels were added to the display using the 'quick pick' label option they tended to disappear when some other picking operation (eg selection for blanking or WRITE) was performed.

In addition in the Properties panel, at the specific item sub-level, the 'Entity' and 'Label' column headers were not made 'live' when a selection of items had been made, making it impossible to use this selection to set display or labelling. Both these problems have been fixed.

- ***Case 10763***

When the Part Tree was used to update the model the commands issued from popup menus within it were not being stored correctly in command files (.tcf), with the result that when these were played back they did not reproduce the Part Tree operations correctly. This has now been fixed.

- ***Case 10767***

When using the direct printing option (File => Print) on Windows platforms there is a facility to print at 2x and 4x resolutions. If these were used the image was scaled correctly, but text - and especially labels on nodes and elements - would be too small.
This has now been corrected, and text sizes on 2x and 4x resolution print output should now match what is on the screen. (The match may not be exact because of the limitations of font resolutions, but it should be acceptable.)

- ***Case 10786***

Beam orientation ('3rd') nodes were being drawn when 'attached' node display was turned on. Another consequence of this was that when plotting nodal data components the max/min scan of data was including these nodes, even though they were not normally visible, and giving misleading results.
This has now been fixed: beam orientation (3rd) nodes are now no longer considered to be 'visible' for plotting or max/min scanning unless explicitly displayed using the 'all nodes' switch in the Entity panel.

- ***Case 10787***

When reading modal analysis 'd3eigv' files D3PLOT would skip any modes with -ve frequencies, treating them as invalid files.
This has now been corrected: when reading Eigenvalue analyses -ve frequencies are accepted and displayed as such.

- ***Case 10823***

A crash could occur when using the Part Tree if it contained long titles, was scrolled fully to the right, and then moved up and down. The error appeared only to occur on Win32 platforms, and has now been fixed.

- ***Case 10872***

On Unix/Linux systems the file filter type (.ptf, .rlf, d3, *.*) would not 'remember' the previously read file type correctly, resulting in a subsequent file open using the wrong default filter. This has now been fixed.*

- ***Case 10876***

When there was only one model in the database a FILE > CLOSE MODEL operation failed to pre-select this, requiring some unnecessary button clicks. This has now been fixed.

3.4 Known bugs in Oasys D3PLOT 9.3

- **Case 9408**

Thick shell stresses on wrong surface if MAXINT not equal to 3.

The .ptf (d3plot) file normally writes out 3 “surfaces” of data for thin and thick shells: top, middle and bottom. However if users set the <maxint> values on the *DATABASE_EXTENT_BINARY card to some value other then 0 or 3 then that number of “surfaces” is written instead.

Some such decks in which thin and thick shells are mixed seem to continue to write out the “3 surfaces only” pattern for thick shell data, while writing the requested number for thin shells. However the remaining data fields for thick shells are still present, albeit empty.

This leads to confusion during post-processing since D3PLOT assumes that thin and thick shell surface-related data are both aligned in the same way, and it is possible that the wrong results will be shown for thick shells.

This problem needs more investigation, but in the meantime it is suggested that users interested in thick shell results should leave <maxint> set to 0 (or 3, which means the same thing).

4 Oasys T/HIS

4.1 Enhancements to Oasys T/HIS 9.3

This is a summary of the enhancements that have been added to T/HIS 9.3 since the release of T/HIS 9.3 RC2.

- **Case 11627**

In T/HIS 9.3 an option has been added to control whether curves are redrawn while a user drags the axes or legend around in a graph.
The default is now to display all of the curves to make it easier to position the legend clear of the curves. The redraw of curves can be turned off via the 'Options' drop down menu if it is too slow.

- **Case 11518**

Version 9.3 of T/HIS can now read LS-PREPOST XYdata format curve files. This option is accessed via the dropdown file format selector in the 'Read CURVE' menu.

- **Case 11315**

2 new automatically defined variables have been added to T/HIS 9.3 for use in FASTTCF scripts.
FTCF_PATH This is the full pathname of the directory containing the FASTTCF script.
RUN_DIR This is the full pathname of the directory containing the results for the model. If more than one model is used in the script then RUN_DIRn can be used where (n) is the model number (RUN_DIR and RUN_DIR1 are both the paths for model 1).

- **Case 11170**

T/HIS 9.3 now supports the new *DATABASE_HISTORY_DISCRETE_ID option in LS-DYNA and will display the names of the discrete elements along with their ID's when read from either the LSDA (binout) file or the ASCII DEFORC file.

- **Case 11169**

T/HIS 9.3 now supports the Eroded Energy data components from the MATSUM ASCII file. Previously these components were only available for PARTS from the LSDA (binout) file.

- **Case 10995**

In T/HIS 9.3 the format of numbers printed put using the 'TAB' option in FAST-TCF can now be set using 'C' format specifies. Only f,e,E,g and G formats should be used.
This option is activated by adding an additional 'format' argument to the tab command in FAST-TCF followed by the format specifier. This must be after the data value requested and before any description or varf options.

```
tab e:\sleout_00.tab sle_* min varf peak max energy
```

would become

```
tab e:\sleout_00.tab sle_* min format %.2f varf peak max energy
```

if you wanted to print values out with two decimal places.

- **Case 10008**

In T/HIS 9.3 the description that is output for curve values using the TABA command in FASTTCF can now contain a few special keywords that will automatically be substituted for T/HIS curve properties. At the moment the following keywords can be used

{tag}	replaced with the curve's FASTTCF tag
{label}	replaced with the curve's label
{id}	replaced with the ID of the item used to create the curve
{model}	replaced with the model ID the data came from.

For example the command

```
E:\sleout_00.tab sle_* min Model M{model} Contact {id}
```

would produce a description similar to

```
Model M1 Contact 1 .....
```

- **Case 8299**

In T/HIS 9.3 a new option has been added to the 'READ CSV' file menu that allows an optional row containing axis labels to be specified as well as a row containing the curve labels. By default this option is set to row 2 which is where T/HIS writes the axis labels to if a CSV file is written out of T/HIS.
The FASTTCF commands 'readcsv' and 'readcsv2' have also been extended to include a new additional option 'ar' followed by the row number to read the axis labels from.

- **Case 8143**

Version 9.3 now contains preference options that apply to all programs using the prefix 'oasys*'. At the moment the following preference options appear under oasys*

file_names
maximise
placement
start_in
display_factor
display_brightness
display_saturation
font_size
font_type
left_handed
zoom_factor
laser_paper_size
laser_orientation
laser_mode
laser_insert_file
laser_top_margin
laser_bottom_margin
laser_left_margin
laser_right_margin

All of these preferences are still available under the individual programs and they over-ride the 'oasys*' settings.

- **Case 7639**

In T/HIS 9.3 the default method of displaying an axis scaling factor has been modified so that the scaling factor is now added automatically to the axis label (e.g 'Acceleration (x10+6)'). The old method of adding E6 to the bottom corner of the axis can still be selected via the 'Axes' menu.

- **Case 6218**

In T/HIS 9.3 when curves are output to a file using the write menu they are now output in the order they were selected instead of in increasing ID order. If some curves are selected and then the option to select all curves is used then any previously selected curves will be forgotten and all the curves will be output in order of ID.

- **Case 5857**

T/HIS 9.3 contains a new 'Screen' option in the READ menu for creating curves interactively by clicking in the screen.

4.2 *Enhancements to Oasys T/HIS 9.3 RC2*

This is a summary of the enhancements that have been added to T/HIS 9.3 RC2 since the release of T/HIS 9.3 RC1.

- ***Case 10996***

A new curve Correlation function has been added to the automotive menu in T/HIS 9.3 RC2. This Correlation function provides a measure of the degree to which two curves match. When comparing curves by eye, the quality of correlation may be judged on the basis of how well matched are the patterns of peaks, the overall shapes of the curves, etc, and can allow for differences of timing as well as magnitude. Thus a simple function based on the difference of Y-values (such as T/HIS ERR function) does not measure correlation in the same way as the human

eye. The new T/HIS correlation function attempts to include and quantify the more subtle ways in which the correlation of two curves may be judged.

- ***Case 10994***

T/HIS now support an unlimited number of curve groups. Each group can contain any of the curves within T/HIS and is referenced by a unique user defined name. Curve groups can be created interactively with T/HIS or from within a FAST-TCF script.
In an interactive T/HIS session curve groups can be used for the following
Selecting curves for operations
Blanking / Unblanking curves
Deleting curves
Setting curve styles
Selecting curves for output to T/HIS curve files or CSV files.

Curve groups can currently be used within FAST-TCF for all of these functions except setting curve styles.

- ***Case 10992***

In THIS 9.3 RC2 the output from the "tab" command in FAST-TCF has been modified so that the description printed before the value is now a minimum of 50 characters (left justified). If the string is longer than 50 characters then the complete string is printed.

- ***Case 7883***

The style menu has been modified so that curve styles can now be applied to either individual curves, curve groups or all the curves belonging to the same model.

- ***Case 10932***

In T/HIS 9.3 RC1 and earlier the FAST-TCF command used to output curves to a T/HIS curve file only accepted a single curve as input. If multiple curves were to be output to the same file the first curve was written to the file with the 'copy' command and all the other curves were appended to the file using the 'append' command, this could be very slow if a large number of curves were selected. In T/HIS 9.3 RC2 the 'copy' and 'append' commands have been modified so that multiple curves can be specified and written to the file in one go. As well as being able to specify a list of curve tags in a single command the list can also now contain curve tags containing wildcards or curve groups.

- ***Case 10889***

In T/HIS 9.3 RC2 support for the following Shell and Thick Shell data components from the LSDA (binout) file has been added.

```
SMX - Max Principal Stress
SMN - Min Principal Stress
SMS - Max Shear Stress
SVM - Von Mises Stress
AV  - Average Stress (Pressure)
```

These components are available for top, middle and bottom surfaces only as LS-DYNA only writes these values for the top and bottom surfaces (the middle surface values are averaged).

- ***Case 10888***

In T/HIS 9.3 RC2 support for the following Shell and Thick Shell data components from the LSDA (binout) file has been added.

```
EXX - Strain in XX              EXY - Strain in XY
EYY - Strain in YY              EYZ - Strain in YZ
EZZ - Strain in ZZ              EZX - Strain in ZX
EMX - Max Principal Strain      EMN - Min Principal Strain
EMX - Max Shear Strain          EVM - Von Mises Strain
EAV - Average Strain
```

These components are available for top, middle and bottom surfaces only as LS-DYNA only writes these values for the top and bottom surfaces (the middle surface values are averaged).

NOTE : In the LSDA file the strain tensor values are written out using the element local coordinate system, in the THF file they are in the global coordinate system.

- ***Case 10880***

In T/HIS 9.3 RC2 support for the following data components from the THF, LSDA and NODOUT files has been added.

`Current X Coordinate`	`Basic X Coordinate`
`Current Y Coordinate`	`Basic Y Coordinate`
`Current Z Coordinate`	`Basic Z Coordinate`
`Current Vector`	`Basic Vector`

All of these will be available in the THF file. These components will only appear in the LSDA and NODOUT files from 970 onwards as the nodal coordinate data was only added to these files in 970 onwards.

- ***Cases 9489 and 9060***

In T/HIS 9.3 RC2 the mouse no longer has to be moved into HELP, INFORMATION, CONFIRM and ERROR boxes that popup in front of graphics windows to apply the default action by pressing ENTER. When any of these boxes are displayed keyboard input is automatically redirected to the box regardless of where the cursor is.

- ***Case 8699***

In T/HIS 9.3 RC2 a range of models/curves can be selected/deselected when searching directories recursively by clicking on the first one and then holding down shift to and clicking on the last one in the range.

- ***Case 8148***

T/HIS 9.3RC2 contains 2 new FAST-TCF functions

`'delete tag1 tag2 tag3 ....` *'Deletes curves by tag*

`'condense'` *Condenses curve ID so there are no gaps in the curve numbering. Curve tags are not altered.*

- ***Case 8041***

In T/HIS 9.3 RC2 up to 100 curve files can be opened using the command line. Multiple curve files can be specified by either using multiple -curve (or -cur) options

```
-curve=file1.cur -curve=file2.cur -cur=file3.cur
```

or by a comma separated list of files

```
-curve=file1.cur,file2.cur,file3.cur
```

or by a combination of both.

- ***Cases 7851 and 7848***

In T/HIS 9.3 multiple curve can be selected on the command line to be written out to a T/HIS curve file

`#nnn`	*a single curve id*
`#nn1:#nn2`	*a single range of curve ids*
`(#nn1, #nn2, #nn3:#nn4)`	*a compound string of the above*

- *all curves*

4.3 *Enhancements to Oasys T/HIS 9.3 RC1*

This is a summary of the enhancements that have been added to T/HIS 9.3 RC1 since the release of T/HIS 9.2.3.

- ***Case 10065***

In version 9.2 of T/HIS the $RUN_NAME and $RUN_TITLE variables in FAST-TCF were always set to those of the 1st model if T/HIS had opened multiple models from a model list file. In version 9.3 $RUN_NAME and $RUN_TITLE still contain the information from the first model but the

variables $RUN_NAMEn and $RUN_TITLEn are also created for each model where (n) is the model number.

- ***Case 8895***

In version 9.3 RC1 of T/HIS the curves in the style menu are now displayed using the same sort order as the curves in the curve manager. The model prefix is also now displayed in the style menu.

- ***Cases 8779 and 8685***

In T/HIS 9.3 RC1 onwards the curve manager panel can be undocked and re-docked. When the panel is undocked the menu width can be altered to allow more of the curve labels to be displayed.

- ***Case 8598***

Axis values can now be displayed using 3 different formats.

Automatic	*:*	*12.25E+03*	*(only uses E-3, E0, E3, E6 etc)*
Scientific	*:*	*1.225E+04*	
General	*:*	*12250.0*	

In addition to the 3 different formats the number of decimal places displayed can also be controlled.

- ***Case 8595***

In T/HIS 9.3 RC1 the following options to specify a T/HIS curve file on the command line have been added

`-curve_list=filename`	*where 'filename' is a file containing a list of T/HIS curve files to be read*
`-curve=filename`	*'filename' is a single file containing a T/HIS format curve*
`-bdf=filename`	*'filename' is a single T/HIS BDF format file*

You can also specify a T/HIS command file by giving the filename as the last item on the command line. If the filename at the end of the command line has a '.cur' extension it is assumed to be a T/HIS curve file, '.bdf' is assumed to be a BDF file and anything else is used as the name of a model file to open.

- ***Case 8573***

In version 9.3 RC1 of T/HIS the curve information popup now displays which file a curve has come been read from. If the curve has come from a LS-DYNA results file then either THF, XTF, LSDA or the ASCII file name (e.g DEFORC) is displayed. If the curve has been read from a different file type then the name of the file is displayed.

Other enhancements include the following:

- *T/HIS 9.3 now supports multiple graphs. A maximum of 32 graphs can be created and positioned on up to 32 "pages".*
- *Curves can be blanked/unblanked for each graph separately using either the "Curve Manager" window or a new "Curve Table" option.*
- *Graphs can be positioned on each page using a number or preset formats or each page can have a user defined layout.*
- *A "Quick-pick" menu similar to that in Oasys PRIMER and Oasys D3PLOT has been added to T/HIS. This menu can be used to blank/unblank curves and to modify the styles of curves.*
- *The new quick-pick menu can be used to apply options to either single curves by clicking on them or to multiple curves by dragging out an area using the mouse.*
- *All curve functions that require a single curve as input (i.e. C180 filter) can be accessed via the quick-pick menu. Output options are available to either overwrite the input curve or to generate a new curve.*
- *The position of a graphs left, right, top and bottom axes can now be modified by interactively dragging them to the required position.*
- *The graph legend area can be positioned anywhere within the graph.*
- *In menus that allow curves to be picked interactively curve picking is now enabled by default. As each curve is picked in it highlighted in all of the graphs it is currently displayed in. If a function requires 2 curve groups as input then the active curve group for picking can be toggled using the shortcut key V.*
-

- *Curves can now edited interactively by dragging points on the screen as well as by typing in new curve values. Both the original and edited curves are displayed in any graphs that the original curve is currently displayed in.*
- *New interactive curve editing options also include the capability to add new points, split curve segments and to delete points.*
- *Support for new LS971 output options has been added to both the ASCII and LSDA file readers.*
- *Static images can now be generated using GIF and PNG formats.*
- *The Postscript driver has been rewritten so that it now reproduces the contents of each graph exactly using screen dumps. A PDF output option has also been added.*
- *All output images (including Postscript and PDF) can be generated at either the default screen resolution or at 2 and 4 times the screen resolution.*
- *All output images can now contain a single graph, all graphs or a "page".*
- *Images can now be read in and displayed as the background in graphs. Each graph can have its own background image or all graphs can use the same background image.*
- *By combining the background image option, the capability to reposition curve axes and the new interactive curve editor it is possible to digitise curves by reading the curve in as a background image.*
- *The range of predefined colours in T/HIS has been increased from 14 to 30. In addition to the 30 predefined colours a further 6 user defined colours can be defined via the preference file.*
- *New preference options & command-line*
- *FAST-TCF has been enhanced with new commands for creating and positioning multiple graphs and pages. Other enhancements include options for specifying the new colours, axis formats and image output options.*

4.4 Bugs Fixed in Oasys T/HIS 9.3

- **Case 12267**

In T/HIS 9.3 RC1 and RC2 the names of INCLUDE files in LS-DYNA Keyword files were not processed correctly if they were relative filenames using either '../' or '..\'. This has been fixed in 9.3 RC3.

- **Case 12261**

In T/HIS 9.3 RC1 and RC2 the 'Display' popup menu would not always update it's contents correctly if it was activated using the left mouse button. If the popup was activated by hovering over the button then it's contents would be correct. This has been fixed in 9.3.

- **Case 12247**

In version 9.3 RC1 and RC2 T/HIS could crash on some platforms after a graph was deleted. This crash would happen on HP-UX ITANIMUM systems and could have occured on other platforms. This has been fixed in 9.3.

- **Case 12193**

On Unix and Linux platforms the permissions given to GIF image files would tend to restrict them to the owner only, ie 600 or rw-------.

This has been fixed: GIF files will now be given read and write permissions for all users, as modified by the current <umask> value for the user. Typically this will result in 664 (or rw-rw-r---) file permissions, as is the case for other graphics file types.

- **Case 12134**

In T/HIS 9.3 RC1 and RC2 the number of points in the edited copy of a curve was incoprrectly set if the docked menu was used to insert new curve points. This would result in the edited curve being incorrectly drawn. This has been fixed in 9.3.

- **Case 11980**

In T/HIS 9.3 RC1 and RC2 the strain value reported by T/HIS for the middle surface of Thick Shell elements was wrong if it was read from the LSDA (binout) file - the Top surface value was read.

Values for the Top and Bottom surfaces were correct and all results read from the THF file were correct. This has been fixed in 9.3.

- **Case 11905**

T/HIS 9.3 RC1 and RC2 could crash if the symbol frequency in the 'Display Options' menu was seto zero. This has been fixed in 9.3.

The logic for the symbol frequency has also been corrected in 9.3 so that if a the frequency is defined for a curve (using the Style menu) then that is used. If the frequency for a curve is set to 0 then the value defined in the 'Display Options' menu is used.

- **Case 11879**

In T/HIS 9.3 RC1 and RC2 the redraw speed when dragging the graph axis or dynamic viewing while displaying a background image was very slow on some platforms. This speed has been improved in .

- **Case 11772**

In T/HIS 9.3 RC1 and RC2 the buttons at the top of the curve manager panel could get replaced with buttons looking like the curve ID buttons if a Quick-Pick action was undone for a curve that was not currently displayed in the list of curves in the curve manager. This has been fixed in 9.3.

- **Case 11771**

In T/HIS 9.3 RC1 and RC2 the shortcut keys for blanking; (B)lank, (R)everse and (U)nblank would apply to all graphs if they were used outside of a graph window. In T/HIS 9.3 this has been changed so that if the mouse is outside a graph then the action only applies to the currently active graphs.
The action when the mouse is within a graph window has not changed and is still only applied to the graph the mouse is within.

- **Case 11752**

In T/HIS 9.3 RC1 and RC2 the 'Insert After' option used to edit a curve would lose the value entered for the X coordinate and it would grey out both boxes when you moved to the box for the Y coordinate. This has been fixed in 9.3.

- **Case 11745**

In versions of T/HIS prior to 9.3 if the ORDER function was used to reverse the order of points in a curve and the output was set to overwrite the input then the curve would get messed up as points were being read and written to the same curve and would overwrite each other. This has been fixed in 9.3 by copying the input curve to an internal scratch curve first and then reading data from the scratch curve.

- **Case 11744**

In T/HIS 9.3 RC1 and RC2 the wrong curve could be selected for modifying the curve style via the button in the curve manager if there was a gap in the curves currently being used. If the curve selected was before any gaps then the correct curve would have been selected. This has been fixed in 9.3.

- **Case 11725**

T/HIS 9.3 RC1 and RC2 could crash if a graph was plotted using a logarithmic axis scale and none of the curves contained any points with values greater than 0.0. This has been fixed in version 9.3 by forcing the axis range back to sensible limits when this occurs.

- **Case 11695**

In T/HIS 9.3 RC 1 and RC2 the last letter of the directories displayed using the search directories option might not be displayed in some cases. This would happen if the user had entered a search path of '.' and the number of files/directories found was more than could be displayed without having to display a scoll bar in the menu. This has been fixed in 9.3.

- **Case 11692 and 11300**

In versions of T/HIS prior to 9.3 the Force Magnitude is not extracted correctly for Nodal Force Groups from the LSDA (binout) binary file. This has been fixed in version 9.3.

- **Case 11675**

In T/HIS 9.3 RC1 and RC2 some thick line styles were not drawn correctly when images were output at 2 and 4 times the screen resolution. This problem was machine dependent and occurred if the line width was greater than the maximum line width supported by the version of OpenGL. This problem has been fixed in T/HIS 9.3 by drawing lines that are thicker than the maximum line width supported as a series of rectangles.

- **Case 11672**

In T/HIS 9.3 RC1 and RC2 thick lines were sometimes not displayed correctly on the screen if the curve contained a large number of points in a very small area and would appear as though they had small gaps in the curves. This has been fixed in 9.3.

- **Case 11670**

In versions of T/HIS prior to 9.3 the wrong point was updated in the list of curve points when a point was edited by dragging it interactively. The correct point in the curve was updated it was just the feedback that updated the wrong point. This has been fixed in version 9.3.

- **Case 11664**

In versions of T/HIS prior to 9.3 FAST-TCF scripts generated an error if they used the option to extract the Y value at a given X (yatx) and they were played more than once. This has been fixed in 9.3.

- **Case 11658**

In T/HIS 93RC1 and 93RC2 the Seismic/FFT function only worked the 1st time the menu was displayed. After that the following error message was displayed.

```
'THMATHS: Unknown function code, contact Oasys'
```

This has been fixed in 9.3.

- **Case 11581**

In versions of T/HIS prior to 9.3 the list of curve files returned using the option to select multiple files on a PC was in an order controlled by the PC file selector. In version 9.3 onwards the files are sorted into alphabetical order before they are read.

- **Case 11489**

In versions of T/HIS prior to 9.3 the option ot search directories recursively could get stuck in a loop if the directory structure being searched contained a circular loop using logical links. Version 9.3 has has been modified so that each directory is only processed once even if a loop exists within the directory structure. This problem would only affect UNIX/LINUX versions as Windows does not support the concept of logical links with native NTFS file systems and Windows versions of the software would not follow logical links on NFS mounted file systems.
This fix has also been applied to the option in D3PLOT to search directories.

- **Case 11464**

In T/HIS 9.3 RC2 T/HIS could apply the wrong label to curves if multiple contact forces were read from the LSDA file in one go. This would only occur if the contacts in the RCFORC file were not sorted into increasing ID order. If the force from a single contact was read then the labels would be correct.

- **Case 11401**

In versions of T/HIS prior to 9.3 T/HIS would not read the data correctly from THF and XTF files if you had a file that was larger than 2GB.
If you had a THF that was >2GB and then a THF01 file that was < 2GB then T/HIS would use the size of the THF01 file as the family member size and would therefore skip the data at the end of the THF file. This has been fixed in 9.3.

- **Case 11400**

In T/HIS 9.3 RC1 and RC2 curves were plotted incorrectly if both the X and Y axes were set to log scales. As well as the curves being drawn incorrectly symbols and the cross from the 'point' function would be drawn in the wrong position. This has been fixed in 9.3.

- **Case 11382**

In T/HIS 9.3 RC2 T/HIS could get stuck in an infinite loop if a MACRO function was run that required a single curve as input but multiple curves were specified for the input (so that the MACRO is run multiple times). This has been fixed in version 9.3.

- **Case 11381**

In T/HIS 9.3 RC1 and RC2 multiple 'zoom' boxes could be displayed in graphics area if a zoom operation was started and the mouse was released outside of the graphics box. These problems have been resolved in 9.3.

- **Case 11313**

In T/HIS 9.3 RC2 T/HIS could apply the wrong label to curves if multiple contact forces were read from the LSDA file in one go. This would only occur if the contacts in the RCFORC file were not listed in increasing ID order. If the force from a single contact was read then the labels would be correct.

- **Case 11295**

In T/HIS 9.3 RC1 and RC2 the axis values were not updated correctly if dynamic viewing was used to translate a curve while one or more of the axes were displaying a logarithmic scale. This has been fixed in 9.3.

- **Case 11259**

In T/HIS 9.3 RC1 and RC2 the 'All Active Graphs' button in the Images menu actually selected all graphs for output and 'All Graphs' button selected all the active graphs. This has been fixed in 9.3.

- **Case 11255**

In T/HIS 9.3 RC1 and RC2 the directory names displayed when the option to search directories recursively could get corrupted if the user entered the search path as '.' and then used one of the file selector buttons in another menu. This has been fixed in 9.3

- **Case 11106**

Versions of T/HIS prior to 9.3 would not read RWFORC files which contained 'per segment' force data. T/HIS 9.3 will now read the total forces for each wall correctly but it will ignore the 'per segment' data.

- **Case 11098**

In T/HIS 9.3 RC1 and RC2 the 6 user defined lines that can be added to the bottom right hand corner of the legend area were not being stored correctly for each graph and one set was being used for all graphs. This has been fixed in version 9.3 so that the data is stored individually for each graph.

- **Case 11091**

In T/HIS 9.3 RC1 and RC2 curves were not added correctly to graphs in FAST-TCF scripts if the image output option was turned off. This has been fixed in 9.3 so that the curves and graphs are setup correctly regardless of the image output option.

- **Case 11043**

In T/HIS 9.3 RC2 the FAST-TCF command 'operate com' would not playback correctly if the 2 input curves were referenced via curve tags (curve numbers would work). This has been fixed in 9.3.

- **Case 11035**

T/HIS 9.3 can now read the 'frictional energy' data component from both the SLEOUT ASCII file and the BINOUT file.

- **Case 10919**

In T/HIS 9.3 the value displayed on a curve for the 3ms clip value can now have a user defined label. The default label is '3ms' so that the value would be labelled as

```
'3ms = value'
```

by default. This option is also available in FASTTCF by adding the required label between the time period and the 'tag' keyword. If the label contains spaces then it must be enclosed in double quotes.

```
operate cvs curve_1 0.003 'new label' tag curve_2
```

4.5 *Bugs Fixed in Oasys T/HIS 9.3 RC2*

- ***Case 10936***

In T/HIS 9.3 RC1 the entity selection menu could disappear if the options to display common IDs was selected with multiple models and an entity type with no common IDs was selected. This has been fixed in T/HIS 9.3 RC2 so that the entity menu is now displayed with nothing listed in it.

- ***Case 10912***

T/HIS 9.3 RC1 could crash if a FAST-TCF script contained the old pre 9.3 image output options and the curve styles were specified as part of the image command.

```
jpeg test.jpg curve_1 curve_2 title ....
```

would be fine but

```
jpeg test.jpg curve_1 curve_2 style XXXXX title ....
```

could cause a crash. This has been fixed in 9.3 RC2.

- ***Case 10905***

In versions of T/HIS prior to 9.3RC2 FAST-TCF scripts written out by T/HIS that contained commands to read stress or strain values for Shells or Thick Shells from the 'top', 'middle' or 'bottom' surface would not be written correctly. Instead of the command to set the required surface to 'top', 'middle' or 'bottom' the surface would be set to '-1', '-2', or '-3'. This has been fixed in 9.3 RC2.

If a script with this error is edited and -1 replaced with top, -2 with middle an -3 with bottom then the script will play back correctly.

- ***Case 10809***

In T/HIS 9.3 RC1 if the min/max values were displayed on curves then they were always drawn in white. If the background colour was changed to white then they would disappear. In T/HIS 9.3 RC2 the display of min/max values has been changed so the 'Foreground' colour by default. In addition to this change the FAST-TCF syntax to display the min/max values has been modified as previously it was impossible to highlight the min/max point without displaying the values at that point. The new FAST-TCF options are

```
setup show min on       -   To highlight the minimum value
setup show max on       -   To highlight the maximum value
setup show xmax on  -   Display X value at maximum
setup show xmin on  -   Display X value at maximum
setup show ymax on  -   Display Y value at minimum
setup show ymin on  -   Display Y value at minimum
```

Another option to set the colour used for values has also been added

```
setup min_max colour
```

The colour can be any of the standard colours, Foreground, Background or Curve. If Curve is used then the min/max values for each curve are drawn using the colour of the curve.

- ***Case 10792***

In versions of T/HIS prior to 9.3 RC2 the maths functions TAN and ATAN were written incorrectly to FAST-TCF scripts generated by T/HIS as TAB and ATAB. If a script with was edited to change these back to TAN and ATAN then it would play back successfully. This has been fixed in 9.3 RC2.

- ***Case 10780***

In T/HIS 9.3 RC1 the Quick Pick undo option would not work for operations using 'Quick Pick Only'. This has been fixed in T/HIS 9.3 RC2.

- ***Case 10726***

In T/HIS 9.3 RC1 FAST-TCF scripts generated by T/HIS would not correctly record curve line styles if the option not to draw lines through curve points was used in the 'Display' menu. In version 9.3 RC2 two new FAST-TCF commands have been added that can be used to control this option

```
setup line on
setup line off
```

- ***Case 10702***

In T/HIS 9.3 RC1 curves were not highlighted correctly if they were selected as input to a curve MACRO function. This has been fixed in version 9.3 RC2 and the 'Pick Visible' option has been enabled by default.

- ***Case 10701***

In T/HIS 9.3 RC1 it was possible to select pages that didn't contain any graphs. In version 9.3 RC2 only pages containing graphs can be selected.

- ***Case 10680***

T/HIS 9.3 RC1 could crash if the total length of a curve label (including the model prefix) exceeded 100 characters. The crash would typically show up as en error message as a FORTRAN I/O Error with the last format statement being (6a). This has been fixed in 9.3 RC2.

- ***Case 10677 and 10440***

T/HIS 9.3 RC1 could crash after dynamic viewing on HP-UX ITANIUM machines. This problem has been fixed in T/HIS 9.3 RC2.

- ***Case 10676***

If in T/HIS 9.3 RC1 the quick pick menu was used to select multiple curves by dragging out an area with the right mouse button then the selected curves would not be processed by any of the quick-pick Function options (e.g. invert, C180 ...) This has been fixed in T/HIS 9.3 RC2.

- ***Case 10637***

In T/HIS 9.3 RC1 the following error message could be generated in the console window if the Quick Pick menu was used to change the output of a quick pick function from '1st Free' to 'Overwrite'.

```
 ERROR in SM_ARM_PICK: Box id out of range 0
```

This has been fixed in version 9.2 RC2.

- ***Case 10614***

In T/HIS 9.3 RC1 the option to change the current page by typing a page number into the text box in the Global Command menu didn't work. This has been fixed in T/HIS 9.3 RC2.

- ***Case 10610***

In versions of T/HIS prior to 9.3 RC2 the option to read data using common ID's for multiple models could cause T/HIS to crash if the data was read from the LSDA (binout) database file. The crash could happen immediately during the read operation or from any time after that due to an internal memory overflow. This problem has been fixed in T/HIS 9.3 RC2.

- ***Case 10608***

In T/HIS 9.3 RC1 the number of columns specified for the legend was not written to FAST-TCF scripts. This has been fixed in version 9.3 RC2.

In T/HIS 9.3 RC1 setting the number of decimal places used to display axis values to 0 resulted in the default (3) being used. This has been fixed in version 9.3 RC2.

- ***Case 10606***

In T/HIS 9.3 RC2 the curve selection menus have been modified so that the 'All Visible' button now has two different options that can be toggled using a popup menu. The 2 options available are

`'Visible (Page)'`	-	*Only select curves visible on the current page*
`'Visible (All)'`	-	*Select curves visible on any page.*

- ***Case 10582***

In versions of T/HIS prior to 9.3 RC2 it was very easy to overwrite an existing FAST-TCF script by mistake. In version 9.3 RC2 the APPLY button is disabled until the user has selected either 'Overwrite' or 'New File' if the selected file already exists.

- ***Case 10554***

In versions of T/HIS prior to 9.3 RC2 the 'autoscale' command would not work correctly if a curve was either copied or moved to a new curve number using the popup menu in the curve manager and all other curves were then blanked/deleted. This has been fixed in 9.3 RC2.

- ***Case 10551***

In versions of T/HIS prior to 9.3 RC2 the CSV file reader would not read files containing labels with commas in the label. From version 9.3 RC2 onwards T/HIS correctly reads labels containing commas if the label is surrounded with double quotes.

- ***Case 10522***

Versions of T/HIS prior to 9.3 RC2 could crash if a LSDA binary file was converted to ASCII format and the LSDA file did not contain any GLSTAT data. This has been fixed in version 9.3 RC2.

- ***Case 10493***

In versions of T/HIS prior to 9.3 RC2 FASTTCF scripts generated by T/HIS containing the Automotive EXC command would incorrectly generate a command referencing a curve number instead of curve tag. This has been fixed in 9.3 RC2

e.g.	`operation exc 12 auto tag curve_13`
should be	`operation exc curve_12 auto tag curve_13`

- ***Case 10466***

In T/HIS 9.3 RC2 the SWFORC ASCII file reader could error when reading SWFORC ASCII files generated from the LSDA (binout) file using either the free L2A program supplied by LSTC or the conversion option in T/HIS. The error would occur when spotwelds failed and was caused by the file being generated using a format that was different to that produced directly by the SMP version of LS-DYNA. In T/HIS 9.3 RC2 the SWFORC reader has been modified to cope with the additional formats.

- ***Case 10465***

In T/HIS 9.3 RC1 the ASCII file reader for RCFORC would fail if contact ID's greater than 9999 were used and the RCFORC file was generated using the 'l2a' program supplied by LSTC to convert an LSDA file into ASCII files. This has been fixed in version 9.3 RC2

- ***Case 10439***

In T/HIS 9.3 RC1 selecting curves for quick pick operations by area using the mouse could lead to the program getting stuck into a mode where all mouse movements resulted in spurious rectangles being drawn. This often occurred if the mouse button was released outside the graphics window that the area selection was started in. This problem has been resolve in 9.3 RC2.

- ***Case 10436***

In versions of T/HIS prior to 9.3 RC2 T/HIS could read data incorrectly from the LSDA (binout) file for elements if some of the elements selected for output to the ELOUT file were deleted during the analysis.

T/HIS would correctly detect that the data for some elements no longer existed and correctly read the data from the file but it would write the data to the wrong curve ID if output for multiple elements was read at the same time. If results for only one element were read at a time then T/HIS would generate the correct curve. This has been fixed in T/HIS 9.3 RC2.

- ***Case 10411***

In versions of T/HIS prior to 9.3 RC2 the curve menu that is used by any of the automotive functions like ASI where multiple curves have to be picked as input to a function did not display model prefixes and wasn't sorted into the same order as the Curve manager window. This has been fixed in T/HIS 9.3 RC2 and screen picking curves has also been enabled in this menu.

- ***Case 10354***

In T/HIS 9.3 RC1 the new colour definitions added to T/HIS 9.3 are not correctly processed in FAST-TCF scripts. This had been fixed in 9.3 RC2.

- ***Case 10289***

*T/HIS 9.3 RC1 would not read *DEFINE_CURVE cards correctly from KEYWORD files if the curve data was formatted using the comma separated input instead of the standard keyword format column widths. T/HIS 9.3 RC2 will read both input formats correctly.*

- ***Case 10221***

In versions of T/HIS prior to 9.3RC2 a macro file directory specified in a users local preference file would overwrite the one specified in the system preference file. From 9.3RC2 onwards the macro directory specified in each of the 3 possible preference files is stored and processed separately.

- ***Case 10220***

In versions of T/HIS prior to 9.3RC2 the second curve input for the OPERATE COMBINE function would not be converted correctly if a variable was used in a FAST-TCF script or in a MACRO function.

4.6 *Bugs Fixed in Oasys T/HIS 9.3 RC1*

- ***Case 10036***

In T/HIS 9.2 the $RUN_NAME and $RUN_TITLE variables would not be set correctly if FAST-TCF was run in batch mode with a model list file. This has been fixed in version 9.3.

- ***Case 10026***

In T/HIS 9.2 if multiple curves were input from the KEYBOARD and then written out to a FAST-TCF script the curve tags were applied to the wrong curves.

- ***Case 9861***

In version 9.2 of T/HIS the data extracted from the THF for Part Groups could be wrong if the Parts had not been defined in order of increasing ID. This has been fixed in version 9.3.

- ***Case 9807***

In version 9.3 of T/HIS the 'ERR' function now generates an output curve which is the difference between the 2 input curves. The values reported by the 'ERR' function are stored with the new

output curve and can now be accessed from within FAST-TCF as follows using the property words (max_err, pc_err, pc_max_err, av_err, av_max_err, area_err, err)

```
tab  test.txt curve_1 max_err       Maximum Difference & time
taba test.txt curve_1 pc_err        Max Difference as %age
taba test.txt curve_1 pc_max_err    Max Difference as %age or peak reference
taba test.txt curve_1 av_err        Average Difference
taba test.txt curve_1 av_max_err    Average Difference as %age or peak reference
taba test.txt curve_1 area_err      Area Weighted Difference
taba test.txt curve_1 err           Error Value
```

- ***Case 9802***

In version 9.2 of T/HIS additional uncommented lines would be written out to a curve file if the NASTRAN Table D1 format was used and more than one curve was written to the file. These additional lines would then have to be removed before NASTRAN could read the data. The additional uncommented lines are no longer written out in version 9.3.

- ***Case 9791***

In version 9.3 a new 'tabcr' command has been added to the FASTTCF options. This option is the same as the existing 'tabc' command except that it also forces the next output onto a new line. 'tabc' and 'tabcr' can be mixed in a script so that multiple output can be appended to a line using 'tabc' and then a new line can be started by using 'tabcr' for the last output on the line.

- ***Case 9785***

*In version 9.2 of T/HIS results for *CONSTRAINED_JOINT_STIFFNESS... joints are not read correctly from the JNTFORC ASCII file, all the results are reported as 0.0. This has been fixed in 9.3.*

- ***Case 9687***

In version 9.2 of T/HIS the CSV and CSV2 FAST-TCF output options only expect a single curve input. A curve tag with a wildcard 'curve_*' can be used to specify multiple curves but there is no easy way to select a subset of curves.
In version 9.3 multiple curves can be specified for both of these commands.

- ***Case 9686***

In version 9.2 of T/HIS the 'Key in' option in the curve selection menu correctly highlights curves in the menu but the curves are not selected for output to a file. This has been fixed in version 9.3

- ***Case 9549***

Fix for bug 9459 - rewritten routines for reading SLEOUT and RCFORC ASCII and binout files. The CONTACT->ENERGIES option now has one component 'TOTAL ENERGY'. If a contact surface has energy values for both the Master and Slave sides then the values are summed. If the contact only has a slave side value (single surface contacts) then that value is reported.

- ***Case 9502***

In versions of T/HIS prior to 9.3 the first point in the curve generated by the rolling average operation was always set to zero. In version 9.3 T/HIS correctly sets the first point to the same value as the input curve.

- ***Case 9491***

In version 9.3 of T/HIS the minimum and maximum values for the CLIP function are tested when the APPLY button is pressed to see if the minimum is larger than the maximum. If the values are defined the wrong way round then the values are swapped and the menu updated before the function is applied.

- ***Case 9490***

In T/HIS 9.2 if the zoom shortcut 'Z' is used while using the Point function the Point menu is still displayed after the zoom operation has completed but the point function is no longer active. In T/HIS 9.3 the point function is automatically restarted after the zoom operation is finished.

- ***Case 9488***

The inputs for the CLIP function have been changed so they are now displayed using 7 significant figures.

- ***Case 9477***

If in version 9.2 of T/HIS a FAST-TCF script was run that attempted to reference a curve that was not defined within the script then the following error message was generated which was not very clear.

```
Number exceeds the current curve count:
```

In version 9.3 I have modified this error message so that it now displays the following Attempt to reference a curve not defined in this script. If you want to use this script to process curves that you select interactively then you should convert this script to a MACRO function. See section 5.13 of the manual for more details.

- ***Case 9474***

Version 9.2 could crash on some platforms if the minimum and maximum axis values were set the same. In version 9.3 (and 9.2.4 onwards) a minimum or maximum value for an axis is only applied if it is not the same as the other value.

- ***Case 9384***

In version 9.2.x of T/HIS LSDA files would be ignored if a LS-DYNA MPP run did not output a binout0000 file. In version 9.3 T/HIS checks for any binout file produced and opens the first one it finds.

- ***Case 9381***

In version 9.3 a new 'tabcr' command has been added to the FASTTCF options. This option is the same as the existing 'tabc' command except that it also forces the next output onto a new line. 'tabc' and 'tabcr' can be mixed in a script so that multiple output can be appended to a line using 'tabc' and then a new line can be started by using 'tabcr' for the last output on the line.

- ***Case 9241***

In previous versions of T/HIS if a FAST-TCF script was made containing curves generated with a function like NIJ then the script would contain 1 NIJ command for each of the curves and the resulting plot would then contain multiple copies of curves. In version 9.3 only one NIJ command is correctly generated in the FAST-TCF script.

- ***Case 9207***

T/HIS 9.2 issues a warning if it thinks you are trying to filter a curve which is in ms instead or seconds. If you try and filter multiple curves then the same warning is displayed for each curve. In T/HIS 9.3 there are now 2 new options 'Always Ignore' and 'Always Convert'.

If 'Always Ignore' is selected then T/HIS will no longer issue the warning message and all curves will be filtered without any conversion.

If 'Always Convert' is selected then T/HIS will no longer issue the warning message and any curves that T/HIS thinks should be converted will automatically be converted from ms to s before filtering.

An option to reset this has also been added to the setting menu to rest this.

- ***Case 9074***

Version 9.2 of T/HIS could crash if an old style command file was replayed which was recorded after some menus has already been setup. On playing the command file back T/HIS would crash if a variable which was setup up in one of the menus that was not recorded in script was not initialised.

The following script would crash

```
Read    ....    31    3    2    3    0    0    0    0
Read    ....    31    3    2    3    0    0    0    0
```

```
M1:Node10000132 :  11     4     3     1     0     0     0     0
```

as it tried to access a Node 10000132 without selecting NODES first. If the script is modified as follows

```
Read      ....      31     3     2     3     0     0     0     0
Read      ....      31     3     2     3     0     0     0     0
Nodes     ....      32     3     2   153     0     0     0     0
M1:Node10000132 :  11     4     3     1     0     0     0     0
```

to select NODES before node number 10000132 then the script runs.

T/HIS 9.3 has been modified in a number of routines to add error traps to stop these crashes.

- ***Case 8993***

In version 9.3 of T/HIS the Automotive 3ms clip function has been modified so that it no longer generates a separate output curve containing the clipped curve region. From version 9.3 onwards the clip region is marked on the input curve along with the value. This change has been made to make the 3ms clip function consistent with the HIC function and to correct a bug that prevented the 3ms clip value from being displayed when a FAST-TCF script was replayed.

- ***Case 8912***

Added options to specify a T/HIS curve file on the command line.

`-curve_list=filename`	*where 'filename' contains a list of T/HIS curve files to be read*
`-curve=filename`	*'filename' is a single file containing a T/HIS format curve*
`-bdf=filename`	*'filename' is a single T/HIS BDF format file*

You can also specify a T/HIS command file by giving the filename as the last item on the command line. If the filename at the end of the command line has a '.cur' extension it is assumed to be a T/HIS curve file, '.bdf' is assumed to be a BDF file and anything else is used as the name of a model file to open.

4.7 Known bugs in Oasys T/HIS 9.3

- **Case 9407**

Thick shell stresses on wrong surface if MAXINT not equal to 3.

The .thf (d3thdt) file normally writes out 3 “surfaces” of data for thin and thick shells: top, middle and bottom. However if users set the <maxint> values on the *DATABASE_EXTENT_BINARY card to some value other then 0 or 3 then that number of “surfaces” is written instead.

Some such decks in which thin and thick shells are mixed seem to continue to write out the “3 surfaces only” pattern for thick shell data, while writing the requested number for thin shells. However the remaining data fields for thick shells are still present, albeit empty.

This leads to confusion during post-processing since T/HIS assumes that thin and thick shell surface-related data are both aligned in the same way, and it is possible that the wrong results will be shown for thick shells.

This problem needs more investigation, but in the meantime it is suggested that users interested in thick shell results should leave <maxint> set to 0 (or 3, which means the same thing).

5 Oasys REPORTER

5.1 Enhancements made in Oasys REPORTER 9.3

- **Case 11906**

When doing conditional formatting the default font for each condition is now the same as the existing font before you asked for conditions (so for example you have to change only the colour). Previously the defult font was always 10pt Courier.

- **Case 11904**

If you double click on a variable in the Edit variable menu it now edits the variable.

- **Case 11902**

A library script has been added to read a reporter variables file.

- **Case 11741**

The library directory for Reporter has been renamed to 'reporter_library'. Existing scripts which use 'library' will be modified when Reporter reads the file.

- **Case 11461**

A new page size 'PPT A4' has been added to allow A4 powerpoint slides to be made.

- **Case 11332**

In the menu that is mapped when the user right clicks on an object, Edit and Delete were next to each other. Occasionally people pressed Delete by mistake. A space has been added to the menu either side of the Delete button to make it harder to delete the object by accident.

- **Case 9479**

Library scripts which retrieve data from the end of the otf file have been made significantly quicker.

- **Case 9028**

It is now possible to have D3PLOT and FAST-TCF objects that do not return images to REPORTER.

- **Case 9010**

A new 'Expression' variable type has been added that allows user to do simple maths with variables. e.g. (%THREE%+%ONE)*%THREE%/%TWO%.
In fact it will evaluate the expression as a JavaScript expression so Math.sqrt(), Math.sin() etc are also available.

- **Case 9006**

After reading in a template, Reporter now shows the first page, not the last page.

- **Case 8999**

A File.Mkdir() method has been added to enable a directory to be created in scripts.

- **Case 8793**

All dialog boxes in Reporter now have a maximise button to make them easier to resize if they need to be made bigger (e.g. if editing a FAST-TCF object)

- **Case 7701**

In design mode, programs that use library scripts now have %REPORTER_HOME%/reporter_library/scripts removed from the beginning of the text that is shown on the object so it is easier to see what the program is.

- **Case 7233**

Normal table objects have now been added to Reporter.

5.2 Bugs fixed in Oasys REPORTER 9.3

- **Case 11848**

Printing did not work for autotable objects. This has now been fixed.

- **Case 11502**

If the user used 'Save As' and tried to save as a report but didn't give an extension .ort was added instead of .orr. This has now been fixed.

- **Case 9782**

When the dyna filetype preference was changed in Reporter it did not change the filetypes for any existing objects in the template.
Additionally, when opening a template, if the preference was set to 'oasys' Reporter would silently change any 'd3hsp', 'd3thdt' and 'd3plot' definitions to '%DEFAULT_JOB.otf', '%DEFAULT_JOB.thf' and '%DEFAULT_JOB.ptf' and there was no way to undo this change.

Now if you change the preference interactively Reporter looks to see if any filenames need updating. If they do then it asks you if you want to change them.

Similarly, if you read a template REPORTER checks and asks you if you want to change them. However, this is not done if the batch option has been set.

- **Case 7694**

Zooming a report to 800% could crash Reporter on linux machines. This has now been fixed.

- **Case 6257**

Postscript output has been removed from Reporter for version 9.3. Use pdf output instead.

6 Oasys SHELL 9.3

6.1 Enhancements made in Oasys SHELL 9.3

- **Case 11885**

A preference, shell*temp_folder can be set to specify where to write the .bat file. If it is not set then attempts to write to C:\TEMP and C:\TMP are made. If these don't work then the environment variable SYSTEMDRIVE is checked and an attempt to write a TEMP folder to this drive is made.

If all these fail, the user is prompted to change the temp_folder preference to a writeable drive.

6.2 Bugs fixed in Oasys SHELL 9.3

- **Case 12220**

In the OASYS shell a hover-text popup is mapped to show the full contents of any text button if they are too long for the existing button width.

When a child shell window is mapped, ie the 'Options' box for any programme, the popup box thus generated was appearing in the original master shell window, not the child one.

This has been fixed: hover-text popups now appear in the correct parent window.

- **Case 10873**

rlf files are now deleted when re-running a job and the user has chosen to delete existing results files.

- **Case 9701**

Mapping the “Start directory” box, and then cancelling returns a corrupt filename string. Now fixed.

- **Case 8969**

The CD command does not work with UNC paths, so you could not submit jobs on remote drives of the form `\\machine\directory\job.key` as the batch script tried to use `cd /d \\machine\directory`.

Instead of using the CD command the 'pushd' command is now used. This works for local directories and UNC paths.

- **Case 8435**

On Windows platforms the Shell gets confused when the monitor window is scrolled and the mouse is then moved outside the shell window(s). Now fixed.

6.3 Known bugs in Oasys SHELL 9.3

- **Case 10686**

One user has experienced problems running LS-DYNA on Windows when several jobs are stacked up to run, but one of them fails. The SHELL stops with the message “Terminate Batch Job (Y/N)” and subsequent jobs are not run.
We have been unable to reproduce this, and are awaiting more information.